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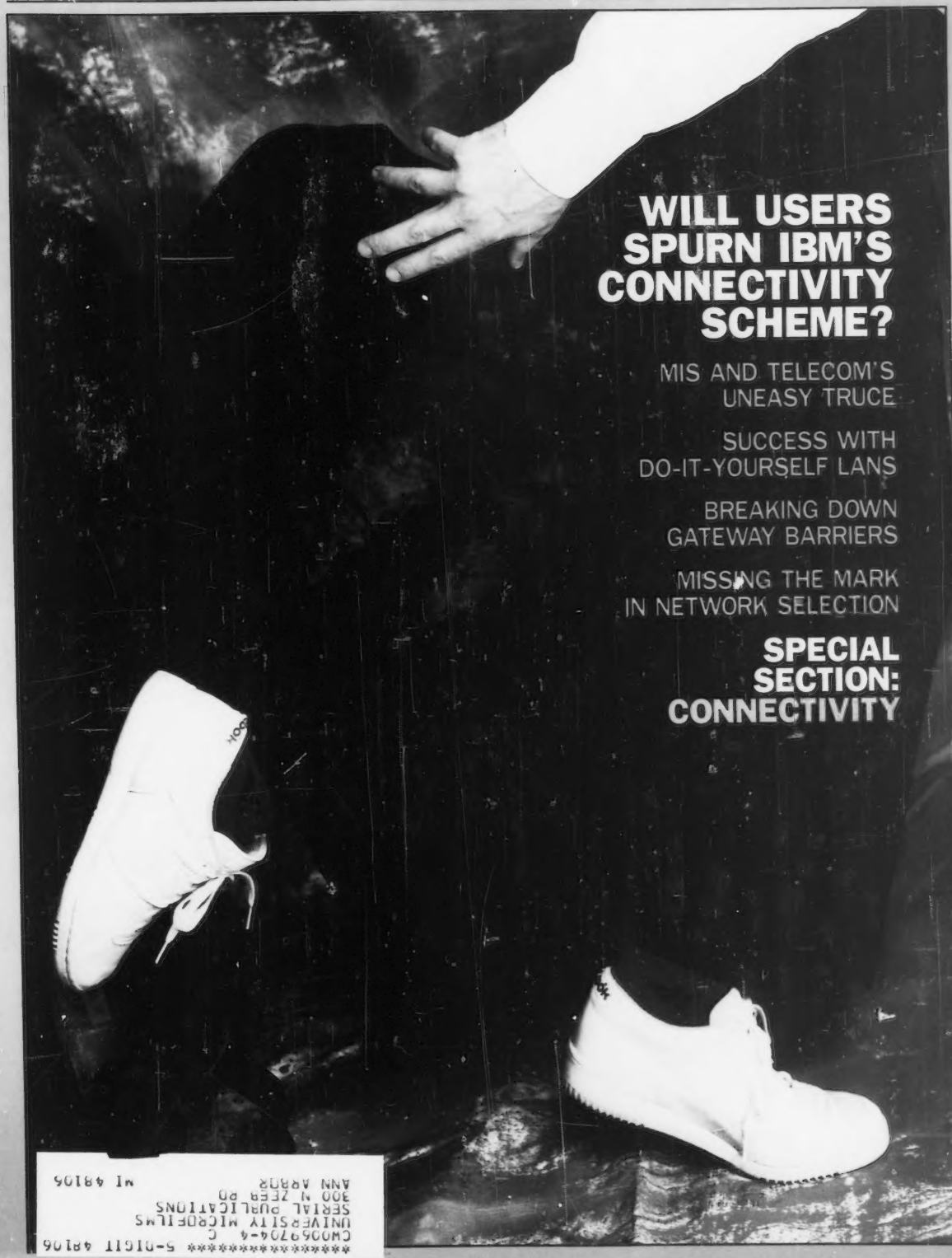
COMPUTERWORLD FOCUS



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COVER PHOTO BY GEOFF O'CONNELL

ABOUT THIS ISSUE

The communications arena is concentrating its money and research on making full connectivity a reality. In this month's *Computerworld Focus*, we'll take a look at the mystique of interconnection and why it has taken the industry so long to get this far. We will examine specific user case studies such as BMW's drive for office automation; vendor offerings and technology trends in distributed DBMS, wide-area networks and very small aperture terminals; and managerial issues that affect every step toward networked systems.

Tie into our information to help you plan for the connectivity revolution.

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Companies are striving to network every piece of equipment in an organization. What will the push to total connectivity mean for MIS? *CW Focus* Features Editor Michael Tucker presents users, analysts and vendors with one version of what connectivity might look like in years to come. The respondents' reactions to this scenario and personal predictions form a picture of the future that MIS cannot ignore.

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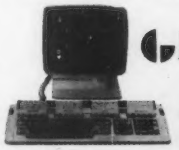

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CONNECTIVITY VIEWPOINT

EDITORIAL

Well-Connected MIS

Being well connected is what it's all about these days. I'm not talking about hobnobbing with the in crowd but rather about that technical buzzword of the '80s — connectivity. Beyond compatibility and systems integration, connectivity has become the rallying cry for some and a warning flag for others.

For the most part, connectivity is in the eye of the beholder. The concept can have a different meaning to each person you talk to. Therefore, the problems, benefits, goals and results that connectivity brings will change from one person to another and, even, from one week to the next.

As of yet, connectivity is a pipe dream in most organizations. But if a firm achieves true connectivity, what accompanying changes will occur? And, what will connectivity mean for MIS?

The demands an end user makes to communicate with the department down the hall, the division across town or across the country or, above all, with the corporate mainframe, can add years to the life of an MIS manager. To the end user, it's simple: instant access over a transparent medium. The MIS manager is the one who must worry about those "inconsequential" details like security, standards and connections in a multivendor shop.

Besides the technological headaches, MIS managers must worry about losing control of their major political resource — namely, information. Many managers are concerned that the role of MIS will decline in importance if they lose data control; therefore, many are dragging their feet to make sure that this fate won't happen to them.

In our Special Section this month, we investigate the impact connectivity may have on MIS's future. Features editor Michael Tucker interviews vendors, users and MIS managers to see what they think will happen to MIS when connectivity spreads throughout an organization. The answers are even more surprising than the questions.

We will also bring you insights into how MIS managers will respond if IBM introduces a closed PC environment. The Big Blue line isn't quite so straight and narrow any more, according to the managers we interviewed. Also in this issue, you'll find out the current state of the cold war between MIS and telecom managers as well as information on gateways, network selection and installation options.

Communications is hotter than it's ever been, and MIS managers need to work to ensure the issues don't get too hot for them to handle.

Ann Dooley

LETTERS

Hands-On Work Key To Technical Schooling

I couldn't agree more with the letter "Graduate Urges Gearing Studies to 'Real World' " in the Jan. 7 issue of *Computerworld Focus.*

My area of concern is the training of microcomputer technicians. So many technical courses and books that train people to repair and maintain complex electronic equipment concentrate on an approach that consists of "this is how it works," "this is what it does" and "here's a bunch of math formulas to help you understand all of this." Any course to train technicians will be only marginally successful if that course does not include very specific examples, procedures and real hands-on practice troubleshooting with test equipment these professionals will use.

There is an infinite number of things that can go wrong in any technical system making it impossible to prepare all students for all the problems they will encounter.

But, comprehensive failure mode analysis should be an integral part of each step of technical training — from the simplest light bulb, switch and wire circuit to discrete component failure to complex analog and digital information center system problems.

Training should include circuit failure along with circuit function. This both-sides-of-the-story approach to training technicians increases student awareness, understanding and acceptance of material that seems vague and irrelevant when expressed only in terms of a mathematical formula.

Come on schools and instructors, get practical!

Larry Baran
Coyne American Institute
Chicago

An Alternate System Fights For Recognition

I enjoyed reading the article, "Secrets Of Survival For Alternate Systems" in the January issue of *Computerworld Focus* because it was both timely and informative.

However, I was somewhat disappointed that Superdos from Bluebird Systems was not included in the review. If you compare Superdos with Pick Systems' Pick and Theos Software Corp.'s Theos operating systems, you will find Superdos to be superior in price and performance.

The Superdos operating system has been the foundation of many multiuser microcomputer systems for the past five years.

Developed to maximize the processing power of Intel Corp. 8088- and 80286-based microprocessors, Superdos provides an open operating environment in the form of ASCII terminals for shared logic among multiple users.

An IBM Personal Computer, Personal Computer XT or AT can serve as the CPU.

Superdos also provides the foundation for language compilers (not interpreters) to port minicomputer applications written in high-level languages to microcomputers.

Although there are more than 20,000 users of Superdos, the operating system still remains largely unknown in the marketplace.

Lawrence P. Ciuffitelli
Bluebird Systems
Carlsbad, Calif.

VAR Finds Success Reselling Pick

Regarding your January software issue of *Computerworld Focus* featuring operating systems, how could you ignore the increasing use of Pick Systems' Pick?

As a value-added reseller company that moved from Cobol to Pick in 1983, it has been the best strategic move imaginable. Customers enjoy the ability to use our software on an IBM Personal Computer AT, Compaq Computer Corp. machine, Digital Equipment Corp. unit running Ultimate, a DEC VAX and Honeywell, Inc. DPS-6 without one change in any of our source or object code.

In a few months, customers will be able to use the IBM 9370.

The concept is easy to sell, easier to maintain and gives us and users what we both want — software transportability and hardware independence on top-selling hardware as well as 20 other hardware manufacturers' machines.

In addition, the Pick operating system has many fourth-generation language features, a relational data base, variable length fields, multivalue fields and good multiuser response. We find our development and maintenance time to be four to five times quicker than on our Cobol applications.

Richard J. Borchers
President
Decision Systems, Inc.
Minneapolis

[The story, "Secrets Of Survival For Alternate Systems" in the January software issue of Computerworld Focus, *dealt with the particular properties of Pick. — Ed.]*

dilB

BY RICH TENNANT

WRITE US

Computerworld Focus will be published 12 times in 1987. We welcome letters to the editor and publish those we judge to be of interest to our readers. Letters may be edited for clarity and brevity.

Letters should be addressed to the Editor, Computerworld Focus, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

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CONNECTIVITY VIEWPOINT

Will Real Connectivity Please Stand Up?

INSIDER
Thomas Roberts

No one can deny that the computer industry is prolific. Even in troubled times, the stream of new products is steady enough to make even a casual observer's head spin. Along with hardware and software, however, the computer industry is also adept at producing something else — new words.

Computer types often take words with legitimate definitions and apply them indiscriminantly, making up buzzwords. Take the word "connectivity" as an example. Connectivity is the type of word that makes defenders of the English language choke on their breakfast cereal.

Connectivity has become one of the hottest buzzwords, and topics, around. The subject picked up steam when someone recognized that stand-alone computers were not living up to their potential. With personal computers spreading to every desktop, mainframes residing in the back room of every major corporation and minis forcing their way into areas in between, the result has been a sea of intelligent islands existing unto themselves.

Wouldn't it be nice if the data stored on these largely stand-alone systems (not to mention the peripherals attached to them) could be shared electronically by all users? Sure it would, and thus, the theory of the three-tiered information systems architecture was born.

In a three-tiered architecture, personal computers are linked to departmental minicomputers, which are then linked to corporate mainframes. What this computing model claims to provide is a vehicle by which information will travel up, down and sideways throughout an organization. Ideally, all the data transfers and conversion necessary to achieve this kind of data sharing should be transparent to the user.

The phrase "transparent to the user" implies that most anybody can have immediate access to any piece of data. With up-to-the-minute information in the hands of corporate decision makers, productivity will soar, and the company with a three-tiered architecture will gain a substantial competitive advantage. Any MIS director successful in bringing about this connectivity ideal will no doubt double his net worth and be assured a spot in the DP Hall of Fame. Or so the argument goes.

Ignores corporate politics

This scenario ignores a number of big problems. Corporate politics are a primary issue. MIS departments are still the keepers of the keys to a company's repository of information. Many fear (and rightly so) that the advance of connectivity means a lessening of control over corporate information in trade for a whole new set of headaches.

For instance, as users are given more access to corporate data, companies must take an entirely different approach to data security and integrity. Democratizing access to a firm's data investment could have the same effect as leaving the cookie jar out for the kids; you might return to find nothing but crumbs. Overriding all other problems, however, is the confusing state of connectivity. While forging physical links between systems is certainly possible, convincing disparate systems to have a civilized conversation is quite another story.

To date, Digital Equipment Corp. is the only computer vendor offering an easy solution for achieving organization-wide connectivity. From the IBM Personal Computer AT-compatible Vaxmate to the VAX 8800, DEC has designed its systems expressly with this goal in mind. If you have an all-DEC shop, all you need do is slap down some Ethernet cable, add a few layers of software, and you have a three-tiered architecture.

The plight of IBM

Unfortunately, most companies have invested heavily in computers from several vendors. And, unlike DEC, most vendors originally designed their systems with few, if any, intentions of having them efficiently share data. IBM is the best example of this.

Roughly 8,500 sites in the U.S. rely on IBM equipment to do their data processing. If you are one of these, you're forced to grapple with a jumble of communications protocols, programs, architectures, facilities and standards to make your equipment communicate. Add to all this the International Standards Organization's Open Systems Interconnect standards for communications between dissimilar computers, and you really have confusion.

It is this mass of nonstandard standards and mounds of programs and protocols that is currently the real impediment to building anything resembling a successful three-tiered systems architecture.

As with the word "connectivity," the real state of data communications is a muddy mess.

Roberts is manager of personal computer research at International Data Corp., a Framingham, Mass.-based industry research firm.

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CONNECTIVITY VIEWPOINT

The Chargeback Process Creates A New Breed Of DP Consumer

MANAGER'S CORNER
Jim Young

One of the most powerful tools to control the use of data processing resources is the technique of chargeback.

Chargeback allows an organization to bill all costs a user incurs to his budget. However, chargeback is different than a simple cost allocation procedure because users have the discretion to use or not use the resources. Hence, the user is treated as a true DP customer, shopping for the support that he feels will benefit him and paying the costs of the contracted services.

Because chargeback drastically changes the way a company acquires and allocates DP resources, it is not a method for the faint of heart. However, in some environments, it can be of immense value.

As the use of DP spreads and the demand for services becomes more intense, it is increasingly difficult to independently determine where to invest in technology. The larger a company becomes and the more varied the potential uses of DP, the more traditional authorization procedures break down.

This scenario is especially true where the need for DP depends on a variety of separately managed business projects and processes. Companies should investigate the use of chargeback in cases in which alternatives such as management steering committees, user/DP planning techniques and so on have been exhausted without users being satisfied that technology is being effectively or sufficiently applied.

The advantages

Chargeback has a number of other benefits besides resource allocation. For example, with chargeback, users are responsible for reaping any and all benefits from the system because it is their decision to spend the money. Chargeback makes the return on investment easier to measure because costs are clearly identified.

Furthermore, MIS managers can justify new resources, people, machines and the like in a more straightforward manner. And, once resources are in place, it seems that the DP department tends to use them more directly on user applications because the user is paying for them.

Hopefully, users will be equally as conscientious. Using chargeback, any departure from a project plan will mean extra expenditures, while user mistakes or increased use of production systems will also result in higher bills.

The overall planning process will become much more meaningful, and the service role of the DP department will become much clearer as a company runs a "business within a business." Chargeback could also allow companies to turn the DP department, traditionally a cost center, into a profit center instead.

The disadvantages

These advantages may be very appealing, but a company must approach chargeback with its eyes wide open. There is an equal number of associated dangers in implementing a chargeback system. For example, if the DP department becomes nothing but a servant, then its ability to lead a company to use technology effectively may be suppressed.

Or, the requirement that users pay for services might preclude the introduction of experimental or developmental systems.

The institution of a chargeback system may also create an adversarial user population. The ability to decide to buy from whomever they choose gives users a lot of consumer power that could be misused.

One danger is the potential for users to get a hold of inappropriate and distracting detail.

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And there's even pressure on companies to make strategic connectivity decisions given the myriad temporary link fixes on the market and the promises of future deliverables from a single vendor.

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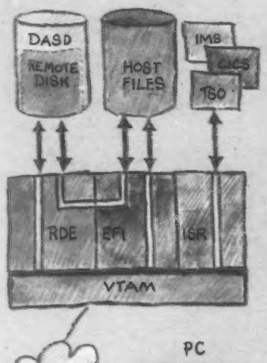

Arbiter's cooperative processing architecture: The Remote Disk Environment (RDE) provides a seamless interface to remote disks on the host. The External File Interface (EFI) transfers data to and from files on the host. The Interactive Session Relay (ISR) connects a PC to another mainframe subsystem simultaneously.

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Circle Reader Service Number 52

CONNECTIVITY VIEWPOINT

Is it really valuable for users to try to dissect the expenses that make up the cost of computer time or disk storage charges? This becomes even more awkward should they begin to question operational decisions, such as the need for maintenance, backup and so on.

Chargeback will not work effectively if management is not willing to recognize the shift in roles. Management must expect that because users are in charge of technical investment decisions, they will measure the DP operation more strongly on its ability to deliver.

An additional difficulty that some organizations face is the financial reporting problem caused by DP costs that are suddenly apportioned as user expenses. This problem may mean recasting past financial statements, planning a multiyear implementation program or just keeping DP chargeback costs on a memo item basis.

A last objection to chargeback is that, ultimately, it is a lot of work. The process can be complicated and time consuming to design, implement and support.

> ”
>
> *Chargeback could allow companies to turn the DP department, traditionally a cost center, into a profit center instead.*

The effort in chargeback is not only that of turning out numbers on a monthly basis but also that of following up on questions, responding to challenges and making adjustments. Managers will quickly build up a great sympathy for consulting firms, service bureaus and the like if only for the billing management problems.

Hopefully, the problems with implementing a chargeback system have not discouraged you but have rather made you respect the seriousness of such a decision.

However significant the obstacles, there comes a time in the life cycle of most data processing organizations when extreme measures are necessary to refocus emphasis, modify behavior, reestablish control and reorient thinking. Chargeback is a tool that can accomplish this.

Not only is the decision to use chargeback very individualized, depending on such diverse factors as company culture, business dynamics or even hardware/software environment, but the way chargeback can be used depends on the individual as well. While the details for deciding to implement a chargeback system are too numerous to recount here, some of the strategies are instructive.

■ **How much?** One dimension of a chargeback strategy will determine the costs you should include in your rates (always assuming that you know all costs and cost factors to begin with).

While purists maintain that full chargeback, that is, charging back all costs, is technically correct, overhead can make your useage rates high. If management is agreeable, you may want to include only direct costs, those clearly giving immediate benefits to a user. Direct costs include application software, mainframe computer costs and programmer time but would not encompass system software or department management costs.

■ **How?** Another question to ponder is how you want to charge. Should all costs be variable, or would a flat fee be more appropriate for some services?

Also, is one scale appropriate or should you use a sliding scale for different levels of usage? What about charges for unplanned assistance like contract programmers? How you charge will influence users patterns of resource utilization. Knowing this fact can help you match MIS service to corporate demands.

■ **When?** Frequency is normally tied to organization budgeting and financial reporting cycles because that is the way money changes hands. However, billing less frequently can focus attention at a summary level; more immediate billing can directly relate usage to fees.

■ **What?** You may want to charge only for selected services such as on-line end-user services. This method is a good way to phase in a chargeback program and can focus control where you most need it.

■ **Who?** You can also choose the level of detail for your billing. It can be a summary of use for a department or an itemized bill for each system, each project or each user. Again, much depends on what you need to control and where resource commitment decisions are made in the company hierarchy.

Many of the choices you will have to make in designing a chargeback system are subtle. But because of the radical impact that chargeback systems can have, they are extremely important in directing the way that your organization uses technology.

Remember that the method in which you bill chargebacks will establish how users decide to use DP services. You must be aware of both the helpful and damaging implications of such a system to make it worthwhile for your company.

Young is managing director of MIS for the Wheeler Group, a Pitney Bowes company located in Hartford, Conn. The firm specializes in direct marketing business supplies. He has worked in the computer industry for 16 years.

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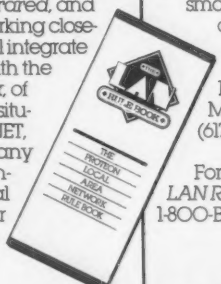

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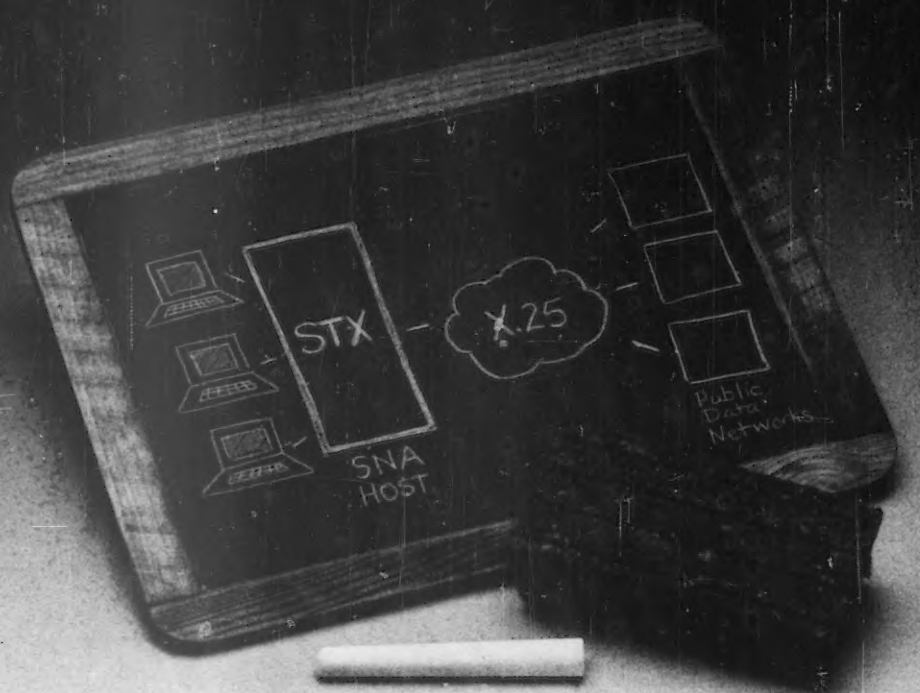

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3317-0547

CONNECTIVITY VIEWPOINT

Travelers To Link 30,000 PCs For Total Integration

Joseph Brophy is the senior vice-president of the data processing department at The Travelers Companies in Hartford, Conn. Brophy won the Data Processing Management Association's 1986 Distinguished Information Sciences Award for his contributions to MIS and data processing.

Trav Waltrip is vice-president of telecommunications in the DP department at The Travelers. Before joining the firm two years ago, Waltrip was instrumental in bringing telecommunications to the leading edge at both American Express Co. and American Airlines.

As administrators at Travelers and spokesmen to the industry at large, Brophy and Waltrip haved formed a powerful tandem to promote the benefits of networking. They spoke recently with Computerworld Focus *senior editor Stan Kolodziej about the changing face of networking in business.*

ALAN D. HOPKINS

Joseph Brophy

> *If you're a company that is highly integrated, very large and handles high-transaction volumes, DEC doesn't look all that attractive except in niche applications.*

I understand The Travelers already has more than 30 local-area networks (LAN) in place, more than 2 million feet of network cabling, and, by 1990, the company is aiming to have 30,000 IBM Personal Computers and PC ATs wired in networks.

JB: That might be an understatement. There will probably be more computers and terminals than that networked.

Why would you need to connect 30,000 PCs?

TW: I'd like to come at that [question] philosophically. Just like the telephone system, we want total integration. We don't want to limit parties from talking to each other because they have no perceived business reason to do so. That's one philosophical issue.

Secondly, we're undergoing a rapid transition from a clerical work force to a knowledge work force. By 1990, a very high percentage of our people will be knowledge workers, and there will be more reason for project teams in different geographical areas to work together.

JB: That's right. We've gone from a product company to a marketing company. We're focusing on distribution systems that now give us the opportunity to make more complex products from our existing product base. But it's still difficult to anticipate who needs connectivity, who is going to be wired to whom. In the meantime, we're putting the infrastructure in place. For example, we have Travelers Health Care, our health maintenance organization operation in San Francisco, and we have our indemnity operation in Hartford. They are going to create products jointly, and those project teams are going to have to work together even though they're in different geographic areas.

Lastly, the economics of wiring everybody together is there. There is no reason against providing everybody with the same connectivity. It's just a natural fallout of putting the network together, like a telephone network.

All this connectivity I assume applies to U.S. businesses in general, not just Travelers.

JB: Absolutely. By 1995, 80% of the jobs in the U.S. will be in the service industry, and service means working with information. That's going to be a foundation of the service industry.

I think that token-ring and LAN architectures [are] really the architectures for the knowledge worker, regardless of the industry he is in.

You put in the IBM Cabling System in 1984, before IBM's Token-Ring Network was actually announced. On hindsight, would you have done anything differently?

TW: No. It gets better and better because there are more [Token-Ring-supported] products coming out. When we decided it was time to start networking, the only announced token-ring product from IBM was the IBM standard wiring medium, not the Token-Ring itself. The standard wiring has saved us a lot of money because it is extremely easy for us to create a LAN. All you have to do is go to a wire closet, connect the wiring to the patch cords, and you have a LAN.

JB: Let's go one step backward. Our whole strategy involves the intelligent workstation. We feel that the intelligent workstation will shortly be the same power as the traditional host computer. So sitting on my desk is essentially going to be a host that will be talking to a bigger host at the data center. Nothing in between. That strategy says my transfer rates have to be very high between the host on my desk and the host in the data center. The IBM Token-Ring network today runs at 4M bit/sec., but it could easily run at 16M bit/sec. in the future. It's part of our strategy to have high transfer rates.

IBM has made a splash recently with the 9370. Is the 9370 going to figure in your networking plans?

JB: Not now, because departmental computing is not part of our goal.

We have a two-tier architecture that says you have a mainframe on your desk and a mainframe in the data center, and, using IBM's LU6.2 architecture, it says that the mainframe on the desk controls the universe as opposed to the traditional view that says the data center host is in control. In that environment and with all the bandwidth we have, there really isn't any reason for having a departmental processor.

TW: I think we may want to use 9370s as file or print servers on LANs or to provide some additional power to a LAN. But the file server is distinguished from departmental processing in that it doesn't run application code. The application code will be run on the IBM Personal Computer AT and the host with no application code in between.

LU6.2 seems to play a large part in your networking scheme.

JB: Absolutely. We already have applications up and running under LU6.2. These are principally developmental applications as well as network management applications. As an example, we collect statistics from all our private automatic branch exchanges and bring them into a [IBM] CICS region in the host. That runs under LU6.2.

You're obviously an IBM shop. Digital Equipment Corp., however, has been making some noise in the marketplace with its networking and connectivity software to IBM's System Network Architecture (SNA). Many feel that DEC has gotten its networking act together, unlike IBM. What are your feelings?

JB: In my estimation that's not true. DEC first of all doesn't fit our plan. DEC has a three-tier networking architecture, and we're a two-tier architecture. DEC's Decnet is based on the [IEEE] 802.3 standard, which is Ethernet networking, and we're based on 802.2, which is IBM's Token-Ring.

If you're a company that is highly integrated, very large and handles high-transaction volumes, DEC doesn't look all that attractive except in niche applications.

Some DEC admirers have criticized SNA for being inflexible and difficult to use. Do you agree?

TW: SNA continues to expand and be more tightly integrated. You can't compare SNA with Decnet, it's like apples and oranges. Everything you do in networking has to fit together, and we have a very good sense of what our architecture is, what our transmission standards are and what our software standards are. SNA has fully integrated all our offices. We've had no problems with it.

JB: DEC likes to say that IBM doesn't have the same connectivity, and that's simply not true. SNA has tremendous connectivity. There's more connectivity with IBM than there is with DEC. The unfortunate part is that IBM gives you a lot of different options. Maybe too many. If you have MVS/XA here and you have some VM over here, there's going to be incompatibility in your environment.

But I don't think that IBM's product base is so much incompatible as it is a much richer software environment than DEC's. If you look at our environment, we're totally compatible and have total integration. We can put a PC any place in the world and, if it has access to a packet network switch, we have connectivity in minutes.

Trav Waltrip

> *Like the phone system, we want total integration. We don't want to limit parties from talking to each other because they have no perceived business reason to do so.*

Then there wouldn't be any

need for PC-to-mainframe links.

JB: Not at all. We have two generic ways that our ATs get into our network. The first is directly from the LAN. ATs are connected to the host through the LAN, up into a gateway, from the gateway through a wide-area network and, boom, right into the host. We need nothing in between.

For those ATs scattered throughout the U.S. and Europe that do not have access to leased lines, we have designed and built a package that allows them to connect to our host environment using the regular packet network. Even though the packet network is an asynchronous environment, the package that we built — part of which runs on the host machine, part on the ATs — makes everything look like an SNA connection.

What are your feelings about AT&T? Do you think it will abandon computers and fade back into voice and data communications?

TW: I think it will continue with computers but its strategy will be different. The strategy now is to couple computing capability with its primary voice and data communications business. AT&T is now saying that instead of going out and selling minicomputers into an office environment that really is not part of its prime business, it will now sell its minis into its primary business.

So it really hasn't backed off the computer business as much as it has said, "Okay, our primary business is telecommunications, and we will bring our minicomputers in to enhance that business rather than going off and trying to sell our computers to run as separate departmental processors."

Could you elaborate on your earlier comment about the movement toward knowledge workers?

TW: Sure. Maybe I can put it into perspective from our side, as a financial institution. If you look at the product of a financial institution, it is the result of taking some information and creating a product such as a mortgage, a mutual fund or a life insurance policy. These products are created by taking information and transforming it into knowledge.

All of this is heading toward what I call the network marketplace, where everybody will be buying and selling such products from their homes, their offices and so on. Not only must we be able to integrate all the people in our company that are creating these products, but we must also integrate the buyers.

You have to remember that the shelf life of such products is ever decreasing. As soon as we come out with a product, someone is going to offer one slightly better. So networking is going to play a big part not only in creating knowledge and products faster [but also in helping us get the products] quicker to our customers.

So it's not a matter of designing this financial product and sitting back and waiting. It's a continuous mode of taking market information and designing products.

And you're laying the networking base now for that future?

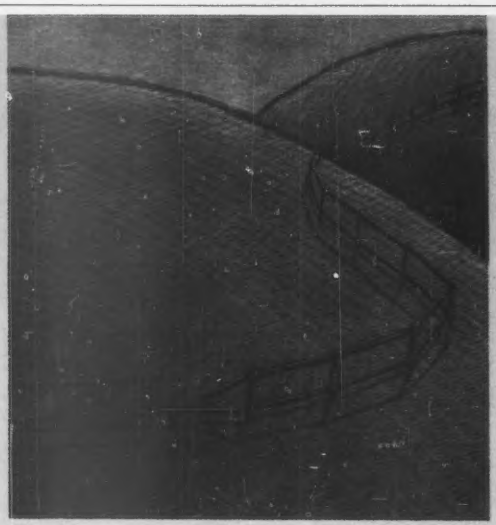
TW: Absolutely. It's coming quickly. We own a bank. The bank itself, and the whole strategy behind it, is a non-brick-and-mortar bank. It's a strategy of technology, it's a strategy of being able to mold a service product. You have a . . . credit card. You have checking privileges, savings, mutual funds investments — whatever you want — all in one account at this bank.

Now, we're aggressively making that service available not only through Touch-Tone phones but also through the home PC. People will be able to sit down in their homes with their PCs and check their balance, transfer funds, change their investments and so on. That's only going to be a part of the network marketplace.

CORRECTIONS

The analyst comparisons in the Desktop Publishing special section chart [*CW Focus*, March 4, page 26] were based on a scale of 1 to 4 with 4 being the highest.

The final word in the story "The Strategist And The PC" should have been "strategist" [*CW Focus*, March 4, page 39].



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NEWS ANALYSIS

Mac, He's Back In Town

Two new open architecture Apple Computer, Inc. Macintosh computers, the Macintosh SE and the Macintosh II, could have a significant impact on the personal computer industry. Some analysts are even proposing that Apple may reclaim the standards-setting role it lost to IBM after the introduction of IBM's Personal Computer.

Of the two expandable Macintoshes, the Macintosh SE is the smaller machine and the one that looks most like the original Macintosh. It has a similar small case and uses the same Motorola, Inc. 68000 processor as the older machine. The "SE" stands for "system expansion," and the Mac has a new bus — the SE-Bus — that can contain one add-in card. It has two internal disks drives, one of which may be a small computer systems interface (SCSI) standard hard-disk system.

In addition, the SE offers 1M byte of random-access memory expandable to 4M bytes and 256K bytes of read-only memory. The Macintosh SE is also twice as fast as the original Mac because of a recent Apple investment in very large-scale integration technologies.

The Mac SE has Apple's networking system, Appletalk, built in. Indeed, the machine's designers seem to have bent over backwards to make this a connectible Mac.

In addition to the internal bus, third-party developers can attach hardware to the SE via an accessory access port, two RS-422 serial ports, an external disk interface, a sound port, the SCSI connector, which can support up to six external SCSI peripherals in addition to the disk drive, and the Apple Desktop Bus. The Desktop Bus, Apple's standard bus for input, can concurrently support up to 16 input devices.

Current pricing is $2,898 for the dual-floppy Mac SE version and $3,698 for the hard-disk/floppy version. Microsoft Corp. MS-DOS coprocessor cards will also be available, but, reflecting Apple's stress on openness, company literature notes that these cards will come from third-party suppliers.

The second machine, the Macintosh II, is very different in appearance from the original Mac. It has a detached monitor and a PC-like computer chassis. Inside, it has a 32-bit, Motorola 68020 microprocessor operating at 16 MHz and a floating-point arithmetic chip. Combined, these chips give the Mac II a speed of 2 million instructions per second.

It is in the Mac II's expandability that the machine begins to get radical. The Mac II contains six expansion slots connected via the Nubus — a relatively little known bus that came out of MIT. The importance of the Nubus is that it is a public domain product. Thus, Apple is clearly sending a message to developers. The Nubus is an open invitation to make boards and peripherals that support the Macintosh II.

Apple is also sending signals in its choice of operating system for the Mac II. In addition to the proprietary Mac operating system and MS-DOS (via coprocessors), the Mac II will offer a Unix option. It will support A/UX, which Unisoft Corp. developed for Apple.

The choice of Unix means two things: First, huge numbers of technical applications developed under Unix are now available to Mac users, and second, developers that wish to write for the Mac II will be able to do so in a familiar environment rather than in Apple's arcane proprietary system.

Analysts' responses to the Macintosh offerings have so far been positive.

Aaron Goldberg, vice-president for microcomputer services at Framingham, Mass.-based research firm International Data Corp., characterizes Apple as one of "the winners of 1987."

He added that there is now a convincing library of business software to help the Macintosh line win the business markets that had escaped it for so long.

A strategic partner for DEC?

Goldberg also noted that the Mac II and the Mac SE have extraordinarily good connectivity to larger computers, a quality that PCs have not been able claim. The Macintoshes' links with Digitial Equipment Corp. systems are so good, he said, that Apple is "almost a strategic partner" for DEC.

Those links, combined with A/UX, mean that the Mac II could have a shot at the low-end technical workstation market.

After the Mac announcement, there was speculation that the new Macintoshes could divide the PC market. Following the IBM PC's debut, the standard for the industry became a machine based on an Intel Corp. chip running MS-DOS. The general assumption has been that IBM would continue to guide the standard with a 32-bit PC based on the Intel 80386 and Microsoft Advanced DOS.

However, IBM appears to be somewhat reluctant to continue in the PC standards role and, as of March, still had not introduced a 32-bit PC.

Now, with the enhanced Mac line, analysts are suggesting that the PC market will be split between two standards — an Intel-Microsoft 32-bit standard and an Apple-Motorola 32-bit standard. Goldberg predicts we will soon see "MacClones."

M.T.

CONNECTIVITY UPDATE

Thumbs Up For Deregulation

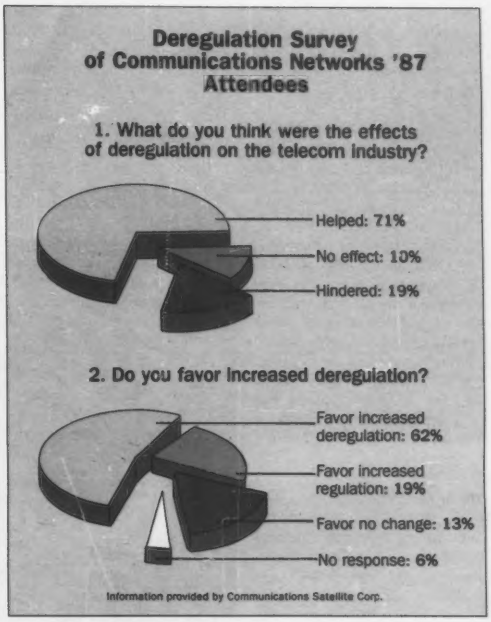
Less is more when it comes to regulating the communications industry. That was the message corporate users gave Communications Satellite Corp. (Comsat) when the firm surveyed 875 attendees of the Communications Networks '87 conference in Washington, D.C. (see chart).

Among respondents, 71% reported that the communications industry has benefited from deregulation. Two-thirds of these supporters also say they favor further deregulation. In addition, more than half of the users surveyed said that deregulation changed the nature of their jobs. Of those, 77% claimed that the changes are improvements.

While 19% of the users reported that deregulation has been a hindrance, only 35% of this group said they would support more regulation. Another 10% stated that deregulation has had no effect.

The survey results were less conclusive for the effect of deregulation on the cost and quality of telecommunications service. About 29% of the respondents said that costs have decreased, while almost 39% reported cost increases. In evaluating quality, 34% cited a decrease, but another 28% claimed an increase.

Though calling for more deregulation, respondents said that a current lack of communications standards is their primary concern. In fact, more than 33% of the users said the absence of standards is the greatest problem facing fully integrated networks. Ironically, deregulation has contributed to the difficulty in establishing standards, according to Richard McGraw, Comsat's vice-president of corporate affairs.



Patrick Expected To Chair FCC

After six years as the Federal Communications Commission's chairman, Mark Fowler will resign this spring. Though his term expired in June 1986, Fowler could have served as chairman until Congress adjourns in late 1987.

However, Fowler, who has been instrumental in the deregulation of the communications industry, would have likely had to face difficult reconfirmation hearings on Democrat-dominated Capitol Hill, according to Washington, D.C., sources.

While in office, Fowler helped implement regulatory changes that reduced long-distance rates by as much as 30%, but those regulations also increased customers' monthly phone charges.

Another deregulation proponent, FCC Commissioner Dennis Patrick, is expected to take Fowler's place. The White House has already announced its support for Patrick, who worked in the White House personnel office before joining the FCC two years ago, an FCC spokesman reports. Moreover, Patrick's support staff has been gaining influential positions, while Fowler's troops have begun pulling up stakes.

The Wait's On For OSI Peer Standard

Don't be surprised if it takes three years before peer-to-peer communications protocols that work with the International Standards Organization's (ISO) Open Systems Interconnect (OSI) model become fully adopted.

IBM made an unsuccessful third attempt to have the LU6.2 peer-to-peer protocol adopted, and now it faces competition from an LU6.2 look-alike.

In January, IBM, Siemens AG and Groupe Bull, through a French standards organization, proposed that LU6.2 form the basis of the OSI transaction processing specifications. However, the proposal met with the same lack of success as IBM's attempt to include LU6.2 in the American National Standards Institute's (ANSI) OSI guidelines.

Similarly, the European Computer Manufacturers Association (ECMA) declined to adopt LU6.2 in its specifications. However, ECMA has since stated a willingness to reopen negotiations with IBM.

The problem is not in the product but in the fact that a company owns it. While many users and analysts agree that LU6.2 is a proven protocol, many still fear that adopting part of IBM's Systems Network Architecture (SNA) would defeat the purpose of having an independent network standard.

"SNA has a more richly defined set of functions, and it will be a long time before OSI catches up," according to David Terrie, president of Newport Consulting, headquartered in Scituate, Mass.

However, he states, vendors and users alike are more comfortable following an open environment such as OSI. "It's a much surer strategy than having to react to IBM's SNA protocol changes."

In addition to users' and vendors' hesitations, IBM's LU6.2 now faces competion for ISO acceptance from a set of specifications coauthored by John Neumann, vice-president of Omnicom, Inc., a Vienna, Va.-based research firm. These specifications have been submitted to the OSI subcommittee by ANSI, which spurned IBM's LU6.2 proposal last year.

In June, the subcommittee hopes to decide on a basis for the OSI transaction processing standard.

That objective may be too optimistic, according to Neumann, who predicts that a decision will come by the end of this year. After that, he says, it may be another two years before the standard becomes fully adopted.

PC LANs Shift Into High Gear

Personal computer local-area networks (LAN) are slow starters in terms of corporate use, but their use will shift into high

See **UPDATE** page 16

NEWS ANALYSIS

Is Intel Selling Its Own Motherboards?

Intel Corp. manufactures 32-bit 80386 microprocessors. And, it also sells them. That much is obvious.

Less clear is whether Intel is also making computer motherboards and selling them. For months, Intel spokesmen have flatly denied this allegation or given a determined "no comment."

But, for the past several months, small advertisements have appeared in the backs of personal computer-related publications. These ads, placed by remarketing firms, offer to sell through the mail a complete motherboard — with user's manual, BIOS and a 32-bit bus — at approximately $3,000 for a quantity of one. Furthermore, the ads also say "entire board manufactured by Intel." The advertisements even state an Intel part number for the board, "SBC-386-AT."

Intel under pressure

Under pressure, Intel has begun to admit that it is making and selling motherboards. "But only," Intel spokesmen say, "in very large numbers and for very large accounts."

So, why isn't Intel talking about the situation? Perhaps because if Intel were selling such boards, the company would be in direct competition with some of its best customers that are board makers for IBM Personal Computer-compatible machines.

The question for the independent board makers is how seriously Intel's foray into motherboard production and sales will impact these makers' businesses.

Relatively sophisticated vendors will probably emerge unscathed because they can give their products market identity with superior engineering. But, for the garage or foreign vendor, the introduction of an inexpensive, well-designed 80386 motherboard backed by Intel's marketing clout could be a very dangerous development.

M.T.

UPDATE from page 15

gear in the next four years, according to a recent study of LANs by Framingham, Mass.-based International Data Corp. (IDC).

The PC LANs in businesses today are generally small, averaging about eight PCs, IDC's study reveals. Furthermore, many of these PC networks are likely to be a pilot project by MIS or an isolated departmental network used for peripheral sharing or electronic mail, according to the report. Most of these LANs lack communications gateways to other networks or systems.

This limited use appears to reflect users' reservations about the efficacy of PC LANs. In fact, only 15% of the organizations IDC surveyed say that the PC LAN is an effective substitute for departmental computers.

One problem is a perceived lack of software for networked PCs. Although multiuser applications are available from vendors such as Ashton-Tate and Microrim, Inc., most organizations claim that good multiuser software is still unavailable for PC LANs.

Another problem is that LANs are difficult to install and debug and require extensive training, IDC states. In addition, PC LANs are still an expensive solution. The average cost per PC exceeds $1,000, according to the report. Moreover, IDC predicts that PC LAN pricing will decrease only slightly through 1991.

Yet several factors, including increasing multiuser software development, growing user experience and the introduction of low-cost Intel Corp. 80386-based LAN servers, will contribute to significant growth of the PC LAN market. In 1986, there were about 100,000 PC LANs installed, but by 1991, this number will grow to almost 700,000, the IDC study predicts.

R.H.

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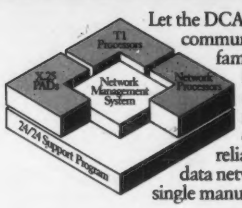

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NEWS ANALYSIS

Netbios, MS-DOS 3.1 Pick Up Steam As De Facto Standards

While the International Standards Organization's Open Systems Interconnect (OSI) promises to bring some much-needed stability to high-end networking, the local-area network (LAN) market could also benefit from the appearance of a white knight for standards.

The lack of powerful LAN operating systems has long been a thorn in the sides of users and has been pointed at as one of the primary reasons that LAN sales have had trouble taking off.

That situation is changing.

Until the introduction of IBM's PC-Net protocols and Microsoft Corp.'s MS-DOS 3.1, which is a networking extension of Microsoft's stand-alone MS-DOS operating system, LAN vendors had to write software specifically to the upper level protocols of individual networks. Not anymore.

MS-DOS 3.1 has become a de facto standard at the upper protocol levels, and both IBM's PC-Net and Microsoft's MS-Net network protocols support MS-DOS 3.1. Novell, Inc.'s Netware operating system also supports MS-DOS 3.1.

At the low-end LAN transport and network layers, however, the standards situation is a bit different. Several different protocols exist at this level, though an early de facto champion would have to be IBM's Netbios set of protocols.

Though few non-IBM networks currently support the full set of Netbios protocols, major LAN companies such as Novell and 3Com Corp. have officially committed to producing networks fully supporting Netbios in 1987. In the meantime, heavyweights such as Hewlett-Packard Co., IBM and AT&T have joined many others in expressing their support for MS-DOS 3.1.

Support from such major companies seems to make the future of LAN protocols a little clearer. This backing of Netbios and MS-DOS 3.1 will spur further support from second-tier LAN vendors, and the resultant snowball effect will most likely establish Netbios and MS-DOS 3.1 as true de facto standards in the near future.

That is good news for network users who have expressed disappointment at major micro software vendors' hesitation to port their software to specific, proprietary LANs.

It is hard to blame software vendors, however, that do not want to commit time, research and expenses to port stand-alone software to a proprietary LAN architecture that may not exist in a year. These firms are waiting for a clear-cut vendor to dominate the market. That hasn't happened on the LAN hardware side yet, though Netbios and MS-DOS 3.1 seem to be the big winners on the LAN software side.

Playing software catch-up

Whatever happens, network vendors have some catching up to do in offering good network software to users. Many popular copy-protected programs, for example, still cannot run off hard-disk-based file servers. Also, most stand-alone programs are unable to make calls to the network to take advantage of such basic network security features as file locking.

"There's a lot of room and time for improvement in LAN software before [IBM's peer-to-peer communications protocol] LU6.2 arrives," explains Bruce Fryer, system manager at Travenol Laboratories, Inc., in Springfield, Ill.

Programs written to MS-DOS 3.1, however, can direct calls to the operating system and take advantage of the operating system's specific network features, such as file and record locking, file transfer and access to remote peripherals.

There is still a large base of vendor-specific networks out there, many of which do not yet support Netbios or MS-DOS 3.1. That could change very quickly as these two de facto standards pick up steam.

S.K.

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Circle Reader Service Number 54

NEWS ANALYSIS

Netbios Users Dissatisfied With IBM

While fat cat IBM is away, competitive mice will play — to the benefit of corporate users who want to hold onto IBM's Netbios communications protocol.

Netbios users feel that IBM has turned its back on them, according to Robert Newton, program director of local-area communications at the Gartner Group, Inc., a Stamford, Conn.-based consulting firm. "IBM wants Personal Computer users to have a strong demand for upstream communications to minicomputer and mainframe processing," he explains. "You can't do that with Netbios, though, so IBM wants to migrate users to LU6.2."

However, dropping Netbios for LU6.2 takes some sacrifices that corporate users reportedly do not want to make. First, there are few off-the-shelf applications written to LU6.2, Newton notes. By contrast, there are thousands of applications written to Netbios.

Second, Newton says, users do not want to be boxed into IBM's networking strategy, and they perceive that moving to LU6.2 would lock them into IBM's Systems Network Architecture (SNA). Buying Netbios does not necessarily mean buying into IBM.

Independent software vendors, systems integrators and value-added dealers that make PC software also fear locking themselves into SNA, Newton says. Their reluctance is contributing to the lack of available software.

Finally, the choice between Netbios and LU6.2 comes down to the dollar, Newton observes. Netbios costs about $45 to $50 to put on a PC; LU6.2 costs $180 to $190. When corporate users have hundreds or thousands of PCs, the price for LU6.2 is difficult to justify.

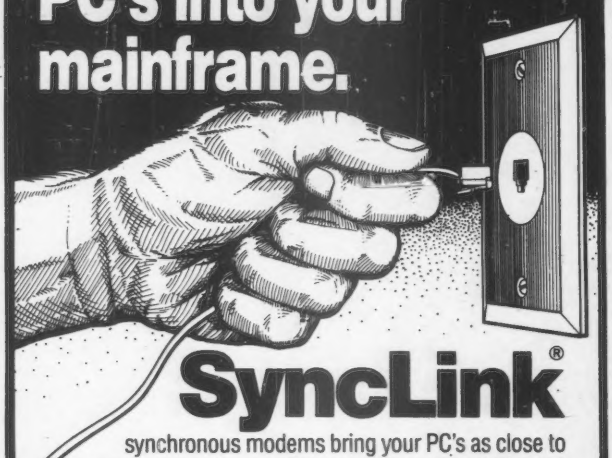
Given their preference for Netbios, many users feel that IBM has abandoned them by not providing a link between Netbios and SNA. "Basically, Netbios is dead," Newton says, "and users are asking, 'Where do I go?' "

The answer is coming from minicomputer vendors such as Digital Equipment Corp., Hewlett-Packard Co., Xerox Corp. and AT&T. These vendors are working on products that support Netbios and provide additional International Standards Organization's Open Systems Interconnect (OSI) and OSI-like networking services, Newton claims. These products will be available by the end of the year, he predicts.

The Netbios products provided by minicomputer vendors should allow users to migrate to sophisticated networking more easily while retaining their investment in Netbios and the applications written to it. Despite IBM's own waning interest then, Netbios appears to have a few lives yet.

R.H.

How to plug remote PC's into your mainframe.



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Critics Hit On Huber Report

Telecommunications users are split in their reaction to the Huber Report put together by Department of Justice consultant Peter Huber. The report basically recommends that U.S. District Court Judge Harold H. Greene release the seven regional holding companies from the restrictions barring them from the fields of information processing services, equipment manufacturing and, to some extent, long-distance service.

Some users see the report as a big move toward opening the telecom field to more competition, potentially lower rates and better service. Others see it as a mess of competitors jamming the long-distance market, causing disruptions in support and quality of service.

The regional holding companies were elated with the Huber Report. But AT&T, MCI Communications Corp. and U.S. Sprint Communications Co. — the Big Three long-distance carriers — would love to wake up tomorrow and find the report was just a bad nightmare.

No wonder. The document would unleash seven huge companies hungry for bigger sales and a bigger playing field. Each of the seven regional holding companies, in fact, registered greater revenue in 1986 than Digital Equipment Corp. Their combined profits exceeded those of IBM in the same year.

The International Communications Association (ICA), a Washington, D.C.-based lobbying group, states that unleashing the holding companies would be a rash, premature act, upsetting an already delicate competitive balance in the long-distance market.

Translation: MCI and U.S. Sprint are not grabbing the amount of AT&T's business predicted a few years back. Both MCI and U.S. Sprint are apparently in shaky financial positions. Releasing the seven regionals, the ICA hints, could finish them.

Criticism for the FCC

Another lobbying group, the North American Telecommunications Association (NATA), which represents more than 600 vendors of customer premises telephone equipment, criticizes the Federal Communications Commission, which praised the Huber Report, for edging toward weakening competitive safeguards. NATA cites rules recently adopted by the FCC that did away with requirements directing the holding companies to set up separate subsidiaries for selling telecommunications equipment.

In the long-distance game, however, there is a slight problem. The regionals already have a monopoly on phone service within their own regions; current long-distance carriers have to go through local loops controlled by the divested Bell operating companies to get into their territories. To balance this, the FCC says it now requires the regional companies to provide competitors with equal and fair access to the local networks through current legislation.

The rancor grows. Long-distance carriers feel betrayed by the Justice Department's recommendations. It was the same department, after all, that entered into the 1982 consent decree with AT&T. It now appears to be doing an about-face.

S.K.

MAP, TOP Gain Support

It appears to have been quiet lately in the world of the Manufacturing Automation Protocol (MAP) and Technical and Office Protocol (TOP). People in the industry, however, tell us otherwise.

January, for example, saw a splash of products introduced at the MAP/TOP Users Group meeting in Phoenix, and recently the MAP/TOP Users Group accepted an invitation to join forces with the Corporation for Open Systems (COS), a group composed of some powerful networking users and vendors with a broad mandate to achieve a goal of network standardization.

According to Charles Gardner, corporate coordinator of systems standards at Eastman Kodak Co. in Rochester, N.Y., and chairman of the U.S. MAP/TOP steering committee, "COS and MAP/TOP members will form a joint advisory council that will provide recommendations for the promotion of MAP and TOP."

MAP expansion in Layer 7 of OSI

Gardner adds that there will soon be considerable MAP expansion in the important seventh, or software application, layer of the International Standards Organizations Open Systems Interconnect (OSI) model on which MAP is based. Gardner says MAP Version 3.0, the seventh layer protocol, will be issued in draft form at the end of this year. It will be officially introduced with fanfare in Baltimore in June 1988.

Gardner sees growing international interest in MAP as very encouraging, citing the recent formation of the World Federation of MAP Users Groups, of which Gardner is chairman. "There aren't a great number of [MAP/TOP] vendors out there yet, but 1987 is going to see a lot more activity, both in number of products and in more vendor and user support," Gardner says.

The product announcements at the recent Phoenix conference included MQ-400, a board-level subsystem designed to connect Q-bus-equipped Digital Equipment Corp. systems to MAP networks. MQ-400 contains software that enables users to run DEC Microvax II applications over MAP 2.1 and 2.2 networks. MQ-400 is from Industrial Networks, Inc. of Santa Clara, Calif.

Marlboro, Mass.-based Concord Communications, Inc. also announced MAP Headstart, which gives the necessary hardware and software to connect three IBM Personal Computers to a broadband MAP network. At the same time, the firm announced an agreement with Siemens AG to jointly develop a bridge between MAP and TOP networks. The product is expected to be available this summer.

A real boost for TOP could come from the federal government's recent release of a set of networking specifications based on the OSI model. Called Government OSI Procurement, or GOSIP, the specifications are said to already conform to 98% of the existing TOP specifications. The remaining 2%, according to Gardner, are already being addressed by Seattle-based Boeing Computer Services Co. and other TOP supporters.

When that issue is solved, the government could quickly become a substantial buyer of TOP-based products.

S.K.

NEWS ANALYSIS

IBM Positions Netview To Recentralize MIS Control

It's hard to imagine any product that makes everyone happy, but IBM's Netview networking management software comes close. Not only does it potentially strengthen IBM's hold on MIS, it also strengthens MIS's position within a corporation.

"Netview represents IBM's strategic attempt to return control of multivendor products to the IBM-dominated MIS department," says Terrence Bentley, director of communications research at The Yankee Group, a research firm in Boston.

For the past several years, personal computers and departmental systems have eroded control from IBM's strength in computer processing — MIS and its central mainframes, he explains. "IBM's strategy is to recentralize control as much as it can by filling a vacuum in network management."

That vacuum, Bentley says, is the lack of a multivendor networking standard. "Data communications is not a controllable environment now," he claims. "MIS is screaming for a way to get disparate systems talking to each other." In addition to IBM Systems Network Architecture (SNA), corporate users have other network architectures such as X.25, Digital Equipment Corp.'s Decnet and the International Standards Organization's Open Systems Interconnect (OSI) model that need to be united, agrees Donald Czubek, president of Gen2 Ventures, a consulting firm headquartered in Saratoga, Calif., that specializes in IBM-compatible communications.

'Mainframe as the center point'

IBM's solution to the vacuum is using Netview to allow the central computer to monitor and communicate with departmental and personal computers. "IBM shows the mainframe as the center point of the architecture," Bentley explains. "Around that CPU are PCs, T1 network management, modems and private branch exchanges, so everything comes back to the CPU center point and MIS."

In this way, according to Bentley, IBM can provide an overlying method of control.

IBM does not provide the only form of centralized network management. There are also third-party vendors that specialize in network control, Czubek says. For example, "MIS can contract with DEC to maintain its network on a third-party basis," Bentley states. DEC cannot leverage the market the way IBM can, he explains, but it can leverage its reputation for technical expertise.

Despite competition, Netview has a few key factors going for it. First, because Netview is a consolidation of older IBM products, many corporate users already work with some of its components. Second, because the older products have been around for several years, Netview is a known quantity, Czubek says.

Three core components of Netview are IBM's Network Communication Control Facility (NCCF), Network Problem Determination Application (NPDA) and Network Logical Data Manager (NLDM).

NCCF provides the network operator with tools on the mainframe to activate, deactivate and check the status of a network. NPDA analyzes problems with the network hardware, and NLDM is an SNA protocol diagnostic tool. If something violates the SNA protocol, NLDM will run line traces to track the error.

Beyond these known components, Netview offers additional benefits. Netview is cleaner and has a consistent interface, Czubek notes. "Network managers used to have three or four CRTs," he recalls. Now network managers only need one terminal and can move easily from one operation to the next, he says.

Another important feature is the Help Desk, Czubek says. With the Help Desk, he explains, an inexperienced network operator can sit at an IBM 3270 terminal and run network diagnostics. The Help Desk feature should become a more sophisticated expert diagnostic system during the next two to four years as IBM incorporates artificial intelligence into it, he adds.

In addition to technical benefits, Netview also has the support of third-party vendors that have begun developing products that support the software.

Today, Netview is limited to one-way communications. The central mainframe can monitor and collect data from other systems on the network, but these systems do not allow nodes to pull data from the mainframe.

However, Czubek says, "IBM has stated that it will be changing Netview to provide a two-way communications path between the IBM host and other systems." Once IBM develops the two-way capability, it will then rest with vendors to take advantage of it, he adds.

However, it will be at least two years before two-way Netview products become available, Czubek predicts. In fact, Netview-compatible products that support one-way communications will not be generally available until late this year or early next year, according to Czubek.

R.H.

News section compiled by Computerworld Focus *staff members Stan Kolodziej, Michael Tucker and Rebecca Hurst.*

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Circle Reader Service Number 68

IBM's Closed PC Could Drive Away Users

BY · PHILIP · GILL

IBM is in a big jam. The key reason? Cheap IBM Personal Computer clones are nipping at its market share and margins.

That means MIS managers and PC support personnel in IBM shops are in a jam, too. Will Big Blue strike back?

Consider the following scenario: It is late 1987. IBM has just introduced a new generation of Personal Computers. They are faster and more powerful than the original PCs, have expanded main memory and disk storage capacities plus integrated IBM Systems Network Architecture (SNA) and LU6.2 networking, courtesy of a set of proprietary IBM application-specific integrated circuit chips. And, most important of all, these new-generation PCs — nicknamed PC VATs for Very Advanced Technology — have a proprietary operating system.

IBM has negotiated a number of sweetheart deals with some of the providers of the most popular applications on the previous generation of PCs, Lotus Development Corp. and Ashton-Tate, to name two. These deals give the chosen few access to the hardware and software specifications of the new-generation PCs. Everyone else has been locked out, and IBM has vowed to protect its trade secrets and to prosecute vigorously those who violate them.

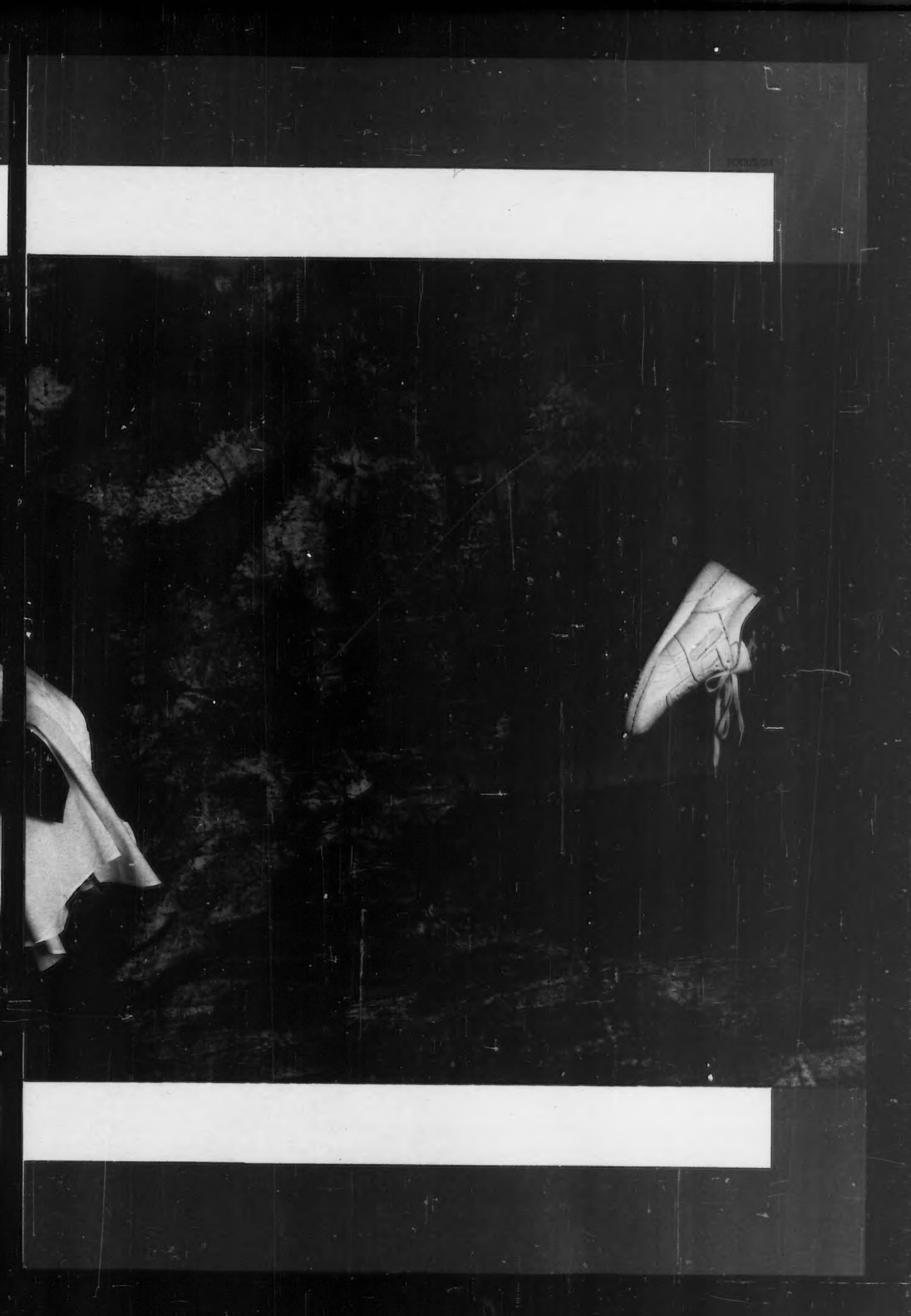
IBM has even cut Microsoft Corp. out of the picture at both the application and operating system levels, apparently for giving "aid and comfort to the enemy," as one analyst has been quoted as saying. IBM now treats Microsoft like any other outsider, as a competitor and a threat. The era of open systems has come to an end. The PC's architecture has become closed, proprietary and controlled by IBM. MIS's worst nightmare has come true.

This scenario of IBM's future is suggested by those who say IBM must move away from the current PC standard based on the Microsoft MS-DOS operating system and the Intel Corp. family of microprocessors, including the 8088, 8086, 80286 and 80386. This faction contends that IBM must save itself from the continually mounting threat of inexpensive domestic and foreign clones. To meet corporate growth objectives, IBM must begin, at least slowly, to walk away from the corporate standard it created back in 1981.

"IBM will begin to migrate away from the current standard by the end of this year," predicts Clare Fleig, director of systems research at the International Technology Group, located in Los Altos, Calif.

On the other side, however, are those who say that IBM cannot walk away from the PC standard. To do so would be tantamount to abandoning altogether current user investments in PC hardware and, more important, applications software.

PHOTO BY GEOFF O'CONNELL



CONNECTIVITY OPTIONS

"IBM can no longer walk away from the PC standard as they can from MVS or VM," says David Ferris, president of Ferrin Corp., a San Francisco-based consultancy that specializes in PC support and services.

Ferris says simply that MIS and information center managers will not go along with IBM if it closes the PC architecture.

For IBM watcher George Colony of Forrester Research, Inc. in Cambridge, Mass., the new-generation, closed-architecture PC is a "doomsday machine" that embodies the most radical move IBM could make to staunch the tide of PC clones.

Disaster for clones

A closed-architecture PC with proprietary application-specific integrated circuit networking, graphics chips and operating system would indeed spell disaster for the clone makers, Colony says.

Especially vulnerable are the cheap Asian imports that have neither the market share nor the technological advantages to survive a serious IBM attack. The makers of these imports would be the first to close shop.

But, as Colony and others point out, will IBM's doomsday machine work the way a science fiction doomsday machine works, destroying its creator as well as its opponents?

"How many [MIS managers] have said they would commit suicide?" joked one manager when asked what an IBM closed-architecture PC would mean for MIS.

Behind MIS's joking attitude, however, lies serious concern. Three managers were interviewed to find out their reactions to IBM's PC options.

Obsoleting the installed base

"I hope I never have to answer that question for real," says Dennis Lockard, manager of end-user support services at Corning Glass Works in Corning, N.Y. "I understand the problems IBM is having with the clones, but I don't think they will be solved by closing the architecture and obsoleting the installed base.

"IBM has promised that it would never, never, *never* do that again," Lockard says, referring to IBM's previous practice of making architectures obsolete by introducing incompatible generations of systems.

In fact, it is highly doubtful that MIS would stand for IBM's betrayal of that promise. A closed-architecture PC "would have absolutely no effect on us at all," says Patrick Marshall, MIS director at Waltham, Mass.-based National Medical Care. He says his firm would go on with its plans to buy cheaper PC clones regardless of any moves IBM might make to close the architecture and lock those vendors out.

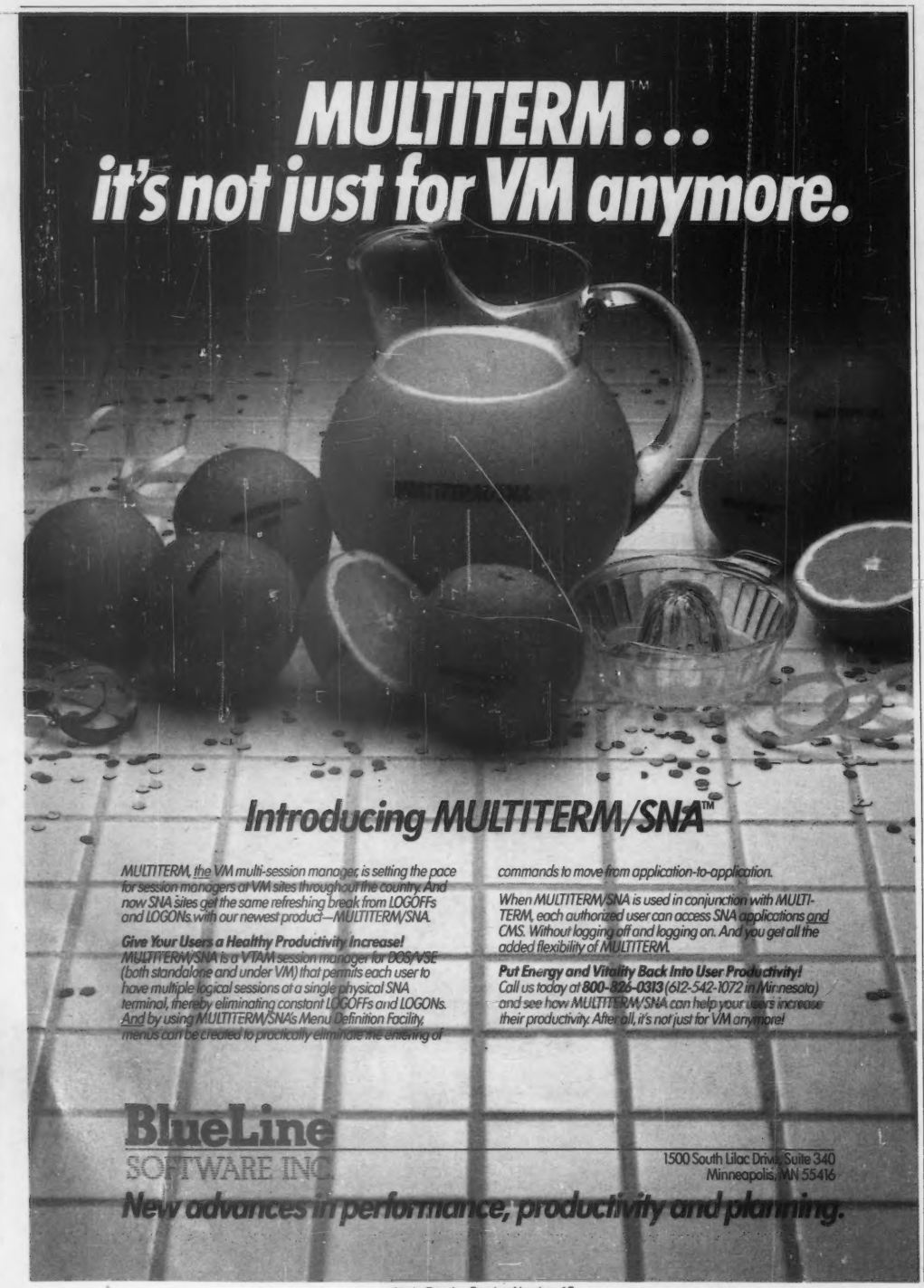
Bill Howard, manager of information services at Bechtel Group, Inc., a San Francisco-based construction giant, says a closed PC would "be a very negative move on IBM's part.

> *'If saving [the hardware investment] means departing from IBM, then we'd seriously consider it.'*
>
> **— Dennis Lockard**
> **Corning Glass Works**

"One of the attractions of the IBM PC has been its open architecture. Compatibles are a good option. They keep the pressure on prices, which has enabled us to have more PCs in the company," Howard says. If IBM brings out a closed-architecture PC, Howard adds, "that could open us up to things like the [Apple Computer, Inc.] Macintosh."

Would MIS managers follow IBM's lead and adopt the closed PC as a new or second standard within their companies? MIS managers say they do not want to face this choice but will if they must and will also consider moving away from IBM.

"IBM has lost control of the marketplace. Unless it can offer us [proprietary systems] for $200 a pop, it doesn't matter. IBM doesn't have anything of value to add," Marshall states.



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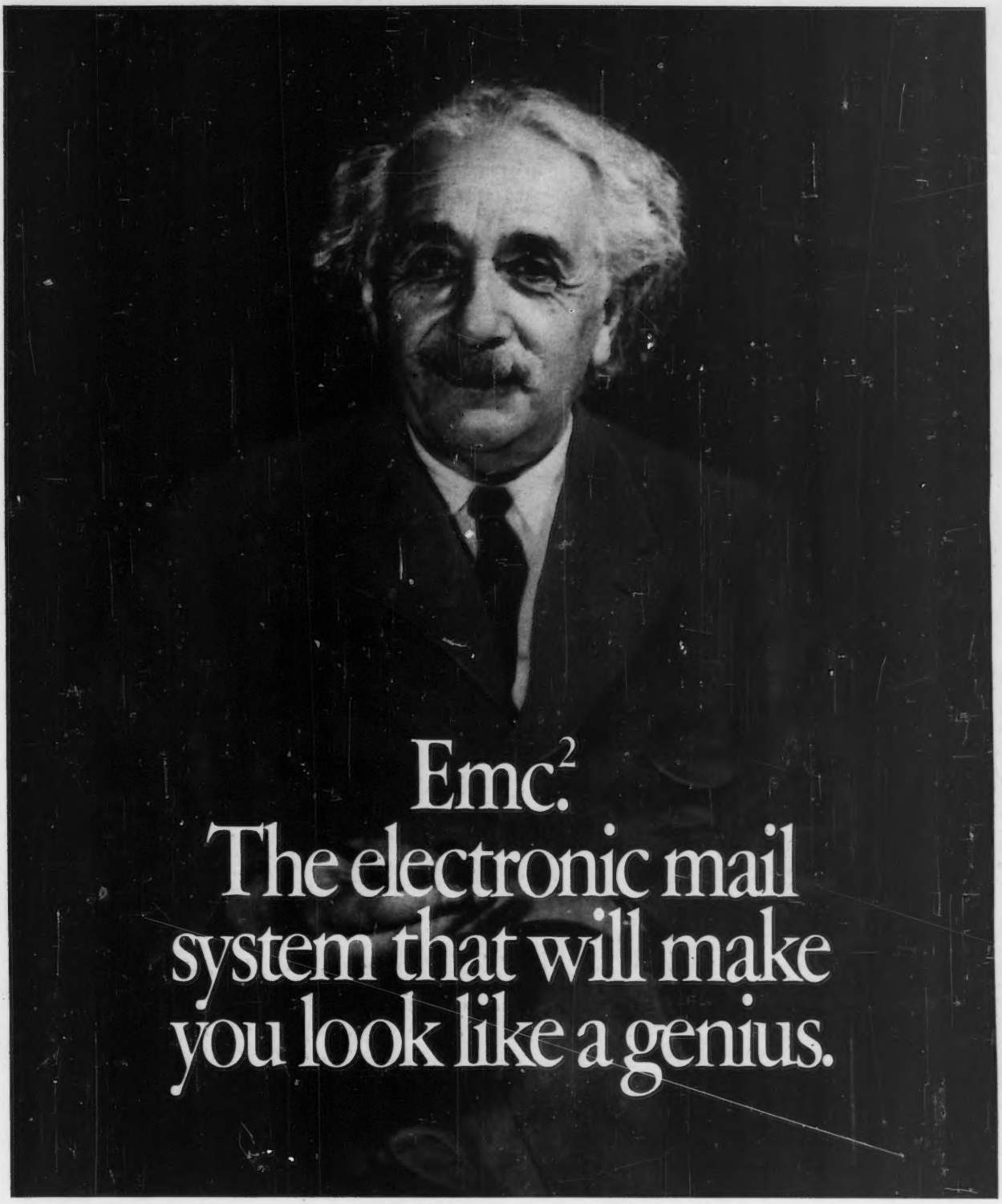

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However, not all MIS managers are so assured.

"We would consider moving away from IBM's lead if it completely closed the architecture," Corning's Lockard asserts.

"I know of another company — not this one — that, when IBM came out with Displaywrite 4 and it didn't support the [Hewlett-Packard Co.] Laserjet, changed word processors to Microsoft Word," he says.

"That shows that the investment in hardware and such that has been built up is too valuable to lose. If saving [the hardware investment] means departing from IBM, then we'd seriously consider it," he concludes.

Bechtel's Howard says his firm would purchase a closed, proprietary IBM system if it suited a particular application. Otherwise, Bechtel's MIS would look at staying with the current MS- or PC-DOS standard, leaving IBM, not the clone makers, in the lurch.

The other scenario Colony paints is far less radical but disturbing to MIS managers nonetheless.

In Colony's outline, IBM would bring out a Compaq Computer Corp.-like 80386-based desktop that runs standard PC applications software right out of the box. But the box has some added extras, such as a proprietary Advanced Program-to-Program Communications/LU6.2 chip and maybe even an IBM DB2-SQL link in read-only memory on the motherboard.

> *'The whole thing for the rest of this decade . . . is connectivity. Going proprietary would be like stepping back into the '70s.'*
>
> **— Bill Howard**
> **Bechtel Group**

IBM, Colony says, would also come out with a full 32-bit communications bus on this new-generation PC, thus setting the de facto standard.

Nevertheless, the three MIS managers surveyed were also negative about this approach. The reaction of Bechtel's Howard is typical of their responses.

"That [move] is a step in the wrong direction," he says. "I want to be able to tie existing and future hardware together.

"The whole thing for the rest of this decade and well into the 1990s is connectivity," Howard continues. "Going proprietary would be like stepping back into the '70s. Anything that would lessen our ability to interconnect would not be looked on favorably. We like the current standard just as it is."

Of course, IBM could simply stay with way things are and come out with an Intel 80386-based PC that has no special or proprietary accoutrements.

But a Personal Computer of this type could be easily copied, too easily, in fact, for IBM's comfort and bottom line. Few observers think IBM will take this option.

Intra-IBM battle

Forrester's Colony contends that there are factions within IBM battling about which direction to take. MIS and users will know which party is victorious by the product that IBM announces.

MIS managers are a lot more independent these days. And it is doubtful that IBM's long-heralded "account control" wielded by its account reps could persuade even senior management at most large companies to abandon current investments in PCs and PC software. That would be as wrenching and costly a decision as it would be to abandon a firm's MVS or VM mainframe and applications software.

Moreover, IBM risks alienating not only big firms but also small- and medium-size ones. These companies just might walk away from IBM entirely.

"The market is too large to categorize broadly, but there are an awful lot of companies that use networked personal computers and Compaq [machines] instead of a departmental machine or even a mainframe as their DP strategy," Lockard explains.

By going with a closed PC architecture, "IBM would basically write off that part of the market to Compaq," he says.

Troubles in the long run

That may be fine for IBM in the short term, but Lockard points out another twist that could soon catch up to Big Blue.

The problem for IBM is that, as time goes on, the number of companies using networked PCs as a DP strategy will grow. This trend will eventually seep into IBM's bread-and-butter accounts.

That fact, combined with MIS's independence, the availability of cheap clones and the certainty that Intel, Microsoft and even Compaq could continue the current PC architecture and even enhance it without IBM's involvement, is probably causing a few restless nights and even nightmares for IBM. F

Gill is a seven-year veteran of the computer industry and the former editor in chief of Unix/World *magazine. He is currently working as a free-lance writer in San Mateo, Calif.*

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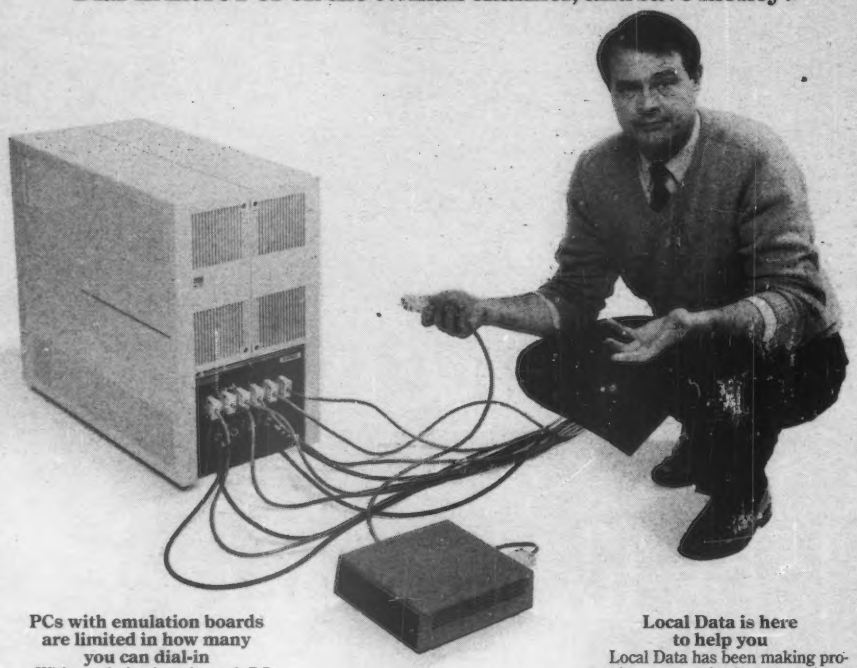

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TELECOM POLITICS

MIS And Telecom Strike An Uneasy Truce

BY · STAN · KOLODZIEJ

There seems to be an atmosphere of peaceful coexistence these days between MIS and telecommunications. Like any relationship, however, there is usually more to the situation than meets the eye.

"Right now, the movement to integrate telecommunications and MIS seems to be all in MIS's favor," declares George Colony, president of Forrester Research, Inc., located in Cambridge, Mass. "A recent survey [Forrester] conducted of Fortune 100 companies showed that 75% have taken telecommunications and MIS and placed them together. In 75% of these same companies, however, it was MIS that wound up running the shop," Colony says.

Berge Ayvazian, director of telecommunications consulting at Boston-based Yankee Group, says it is no secret that telecommunications departments are increasingly coming under MIS's power because of the forces driving data communications. "There is growing pressure for telecommunications managers to learn more about data communications and the data side of information. I don't think there's the same kind of pressure for the data side to learn about voice [communications]."

Why this seemingly double standard? Ayvazian says there has simply always been a more direct line of communication to top-level management from MIS than from telecom. In effect, MIS has had the ear of top corporate executives right from the early stages of its existence.

Ayvazian adds that this link has expanded during the years into a strong political and functional hold at the top levels of corporate power, something that telecommunications has failed to achieve. This parlaying of political influence into a power base has kept MIS in good stead. Conversely, it has also tended to isolate telecommunications, giving it a weaker hand when the current trend to consolidate began to spread.

Chuck Newton, president of Newton-Evans Research Co. in Ellicott City, Md., says, "Voice communications was always there, but, in a way, it has always been separate. DP, however, grew through the corporate financial side [as] a corporate power base.

"That [connection] can be a two-edged sword for DP. On the one hand, finance is a powerful ally and supporter. On the other hand, DP has been trying for years to break away from the grip of finance and establish a more distinct identity for itself. Telecommunications, at least, has never had an identity problem, and that is one of its strengths. [Telecommunications] has a clear growth path," Newton adds.

There may be truth in that. If telecommunications seems to be getting little help from within, it might just be getting some big help from the industry of which it is a part, an industry that is today in constant flux.

"There's a lot happening [in telecommunications] now that is making it an exciting field," explains Bob Klymowich, manager of telecommunications at New York-based Moody's Investors Services, Inc. "Outside the office, there's a world of communications, both data and voice, that MIS knows little about, and it's growing."

Colony and Newton agree. "There are just so many more options in telecommunications now such as satellite, fiber and other bypass technologies," Newton says. "I don't think the computer field is as dynamic. Telecommunications' influence can't help but get stronger."

Colony goes as far to say that DP has become a kind of generic, slow-growth area that will eventually be left in the dust as telecommunications attains dominance in the 1990s.

"When you look around," Colony explains, "all the action is in the telecommunications

BRENT VESEY ILLUSTRATION

field. The future will be in networking — not computers — and I feel the controlling factor will come from the telecommunications side, not MIS."

Paul Howes, director of corporate systems at TBG, Inc., an international industrial conglomerate with U.S. headquarters in New York, says that voice has become a very small piece of the communications action at his company, which relies heavily on data communications to keep in touch with its worldwide offices.

But overall, communications is going to gain influence, Howes says. "Whether that is going to be more under MIS or telecommunications is hard to say. I'd like to think they'll work hand in hand."

Looming large over the future relationship between MIS and telecommunications is the so-called chief information officer (CIO), a potential political lightning rod that could attract the ire of both parties.

The CIO is a relatively recent phenomenon in corporate America. To date, the CIO title primarily refers to any position that oversees both MIS and telecommunications with a mandate of coordinating these separate disciplines to become more competitive forces in corporations. A more global corporate information plan or strategy is needed for this goal of communications cooperation to succeed, and that is the CIO's responsibility.

CIOs for hire

To date, only a few of the large, resourceful and most forward-thinking U.S. firms have been putting CIOs in place. The pace might be quickening, however.

For example, Newton took a break from ongoing research on CIOs to claim that, in his estimation, 20% to 25% of current Fortune 100 companies have already hired CIOs or their equivalents and that most of the remainder are well on the way to doing so.

"What we're finding," Newton explains, "is that CIOs have much more data processing than telecom backgrounds. They also have that direct line to the top corporate brass."

That may change radically, says Colony, who puts this trend in perspective. In the period predating the 1984 divestiture of AT&T, telecommunications and MIS were predominantly kept separate. Telecom personnel dealt primarily with the phone company, monitoring telephone-related costs, Colony explains.

"These telecommunications groups were not prepared for technologies such as digital private branch exchanges, which demanded higher technical expertise," Colony says. The postdivestiture period, which Colony extends to the year 1990, has seen a greater merging of voice and data management under the guiding light of MIS, often under the general division name of Information Systems.

"However," Colony claims, "I don't think that data processing can carry the day." He adds that any single telecom/DP group dominated specifically by DP will have little inclination to work out strategic goals for networking. Colony says that MIS's historic bigotry in favor of IBM, IBM's Systems Network Architecture and centralized rather than distributed solutions may prevent it from network risk taking, an essential quality in the future CIO.

From here, however, Colony diverges from most other researchers and industry watchers. Though most predict a continuation of the tendency to handpick CIOs from current MIS managers and directors, Colony disagrees. Colony believes a new telecommunications/DP structure will emerge beyond 1990. In this scenario, the current CIO type will be replaced or transformed into a so-called chief network officer (CNO) or someone similar.

> ”
>
> *'What I can't see is that [CIO] function leaving the MIS area. Networking is really becoming an MIS function.'*
>
> **— Rod Crawford**
> **Texas Department of Agriculture**

A new type of manager

This CNO, Colony suggests, will emerge as a new type of corporate manager with skills straddling mainframe computing, distributed systems, voice communications and network technology. DP management will report to the CNO, who, more often than not, will have a telecommunications background.

Others, however, are not so convinced of Colony's contention. In the field, MIS and telecom managers emphasize good working relationships with each other, though sometimes the uneasiness or uncertainty does come through.

"I definitely see the formation of more CIOs," explains Rod Crawford, microcomputer manager at the Texas Department of Agriculture based in Austin. "What I can't see is that [CIO] function leaving the MIS area. Networking is really becoming an MIS function."

John Hegner, data communications manager at Moody's Investor Services, says his company is interested in the whole concept of CIOs bridging both worlds.

"From my perspective, I can see data communications evolving from a strictly product-oriented environment into an information strategy," he explains. "As a result, we feel that MIS will assume this

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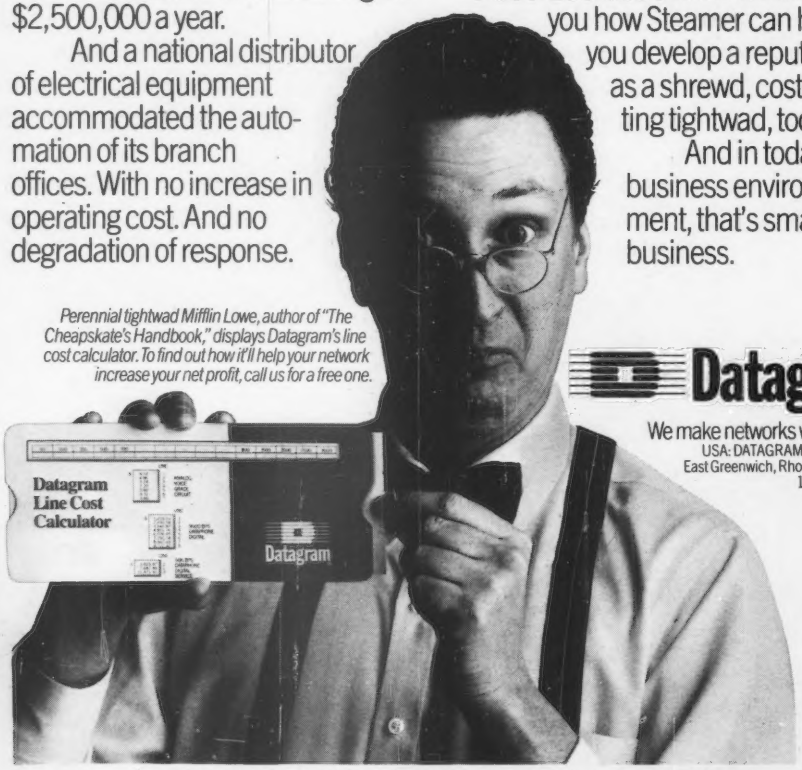

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TELECOM POLITICS

more strategic role. Telecommunications [at Moody's] is a support function."

Klymowich says he feels that MIS and telecommunications have grown closer in the past few years. "As for this CIO approach, though, I think there are a lot of unanswered questions. Where do you find an individual who can work well within both areas?" he asks.

"When you find someone who can do that, you've found someone important. Separation of the two fields is still prevalent, though everything is [going to come] together. Then again, some companies don't even have telecom managers in place yet," Klymowich says.

" It's not a question of MIS controlling these issues. I think telecommunications will play a big role, whatever happens," he adds.

Joseph Brophy, senior vice-president of DP at The Travelers Companies in Hartford, Conn., says that at his firm, management attempts to maintain parity between voice and data communications. "I think a large part of how well telecommunications fares in the future will depend on the quality of the individuals coming into the field."

Campus politics

According to the assistant vice-chancellor of a West Coast university, however, "all data, including communications, has recently fallen under MIS here. Some egos were bruised. Though the voice side reports to another vice-chancellor and the reporting is parallel, voice doesn't have the ear of the president. In reality, but not officially, [voice] is considered more of a support function."

The assistant vice-chancellor, who classifies himself as "the closest thing to a CIO that you can get in an academic community," maintains that although it is essential in his eyes for telecommunications and MIS to work toward the same corporate goals, he sees the future dominated by the DP side.

"MIS is taking over too many [telecom] functions and has strong political bases. I think it's going to be hard to maintain any kind of parity in that situation," he concludes.

One of the big factors in telecommunication's favor, however, might be the growing emphasis toward cutting corporate communications costs, a trend that analysts say will become prevalent in the corporate America of the 1990s.

"I was recently in Tulsa, Okla., visiting a vice-president of information services at one of the top 10 U.S. petroleum companies," Newton explains. "This fellow is really a CIO, who has been empowered to cut computing costs and get his company leaner. That's going to be a big part of any CIO's job in the future, but I think the opportunities available for streamlining are going to be much greater in the telecom field than in the computer area. Telecommunications, unlike the computer industry, is changing radically. If telecommunications managers can grasp [these] initiatives, they will have much better bargaining positions for future [CIO] positions," he concludes.

Ayvazian sees the evolution of both telecom and MIS passing through two stages. During the first stage, which Ayvazian says began a few years ago, a few individuals came to the fore. Top management gave them enough leeway to demonstrate the competitive advantage of MIS and DP. Following their technical successes, these individuals were able to convince top management of the need to create new positions such as CIOs.

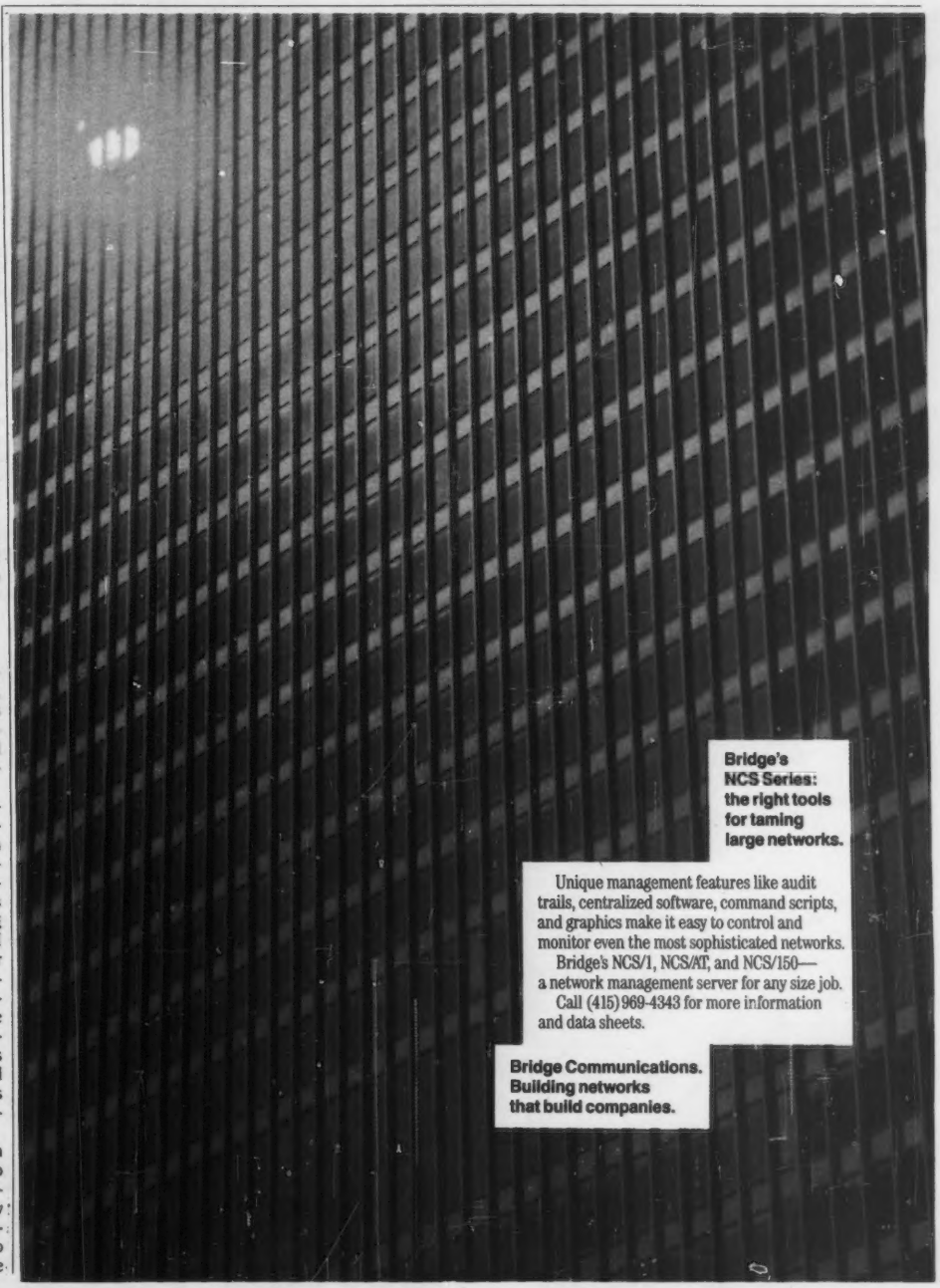
"We're in the second stage now," Ayvazian explains, "whereby these pioneers have become, in a sense, famous, have been bandied about and have become role models for MIS in other large companies. Others want to follow in their steps.

"What we're seeing are the second-tier CIOs coming into place. Some will fail, but others will certainly succeed in pockets of industry such as banking and other transaction-heavy businesses. I don't think the growth track into the CIO is a direct or vertical path, however," Ayvazian says. "The key to CIO positions lies in being more than an MIS director. CIOs have multiple responsibilities. They are being recognized as competitive tools. I think that door of opportunity can be open from the telecommunications side as well."

In the meantime, as the relationships between MIS and telecommunications become necessarily closer, they might not always be as close as the official party lines like to portray. "I think we often scare [MIS] as much as they scare us," Klymowich says. "I think you'll find that happening in most places." F

Kolodziej is Computerworld Focus *senior editor.*

> *'To cut computing costs and get [the] company leaner. That's going to be a big part of any CIO's job in the future.'*
>
> **— Chuck Newton**
> **Newton-Evans Research Co.**



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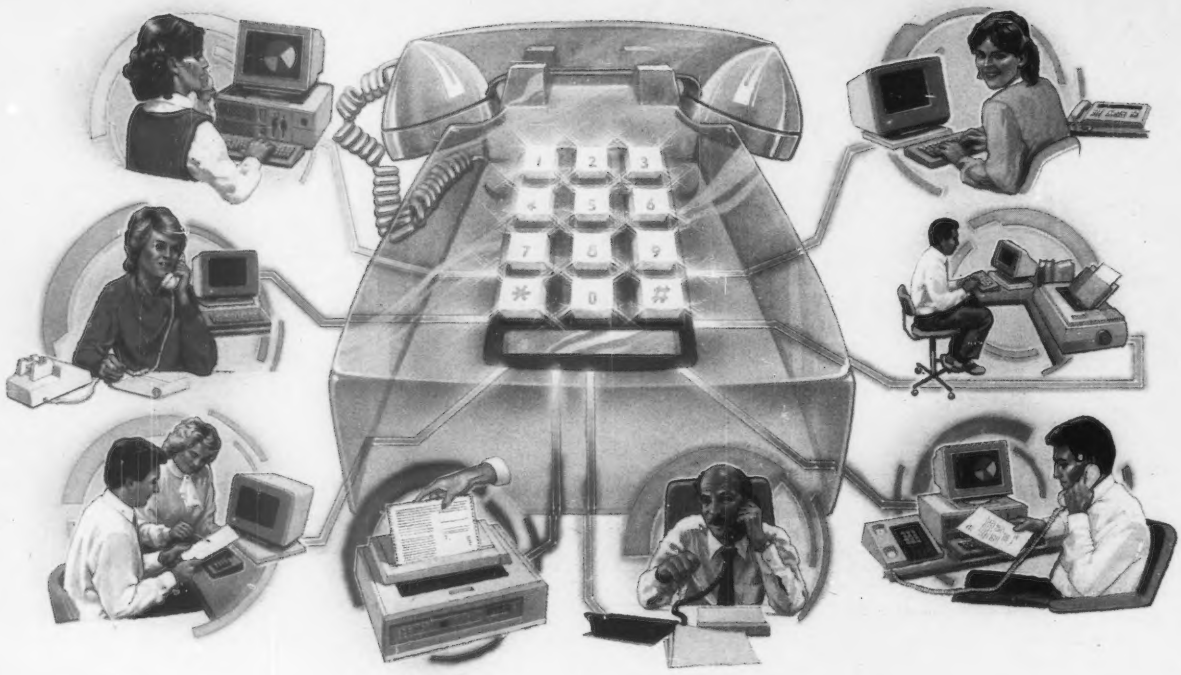

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INSTALLATION TRADE-OFFS

The Trade-Offs Of Do-It-Yourself LANs

MIKE MCGLAUGHLIN ILLUSTRATION

BY·REBECCA·HURST

It seems simple enough. String cable from a server or host to X number of nodes and, voila, you have a local-area network (LAN). In theory, the process has the makings of a perfect do-it-yourself project.

In practice, though, "LANs are quite tricky little devils," warns Ian Ebel, president of Microserv Technologies Corp., a Needham, Mass.-based LAN consulting firm. "If you don't know what you're doing, they can cause you a lot of headaches and grief." Some managers who plan to install a LAN may find the necessary know-how in-house, while others may have to seek outside expertise.

Both small companies with small LANs and large companies with large LANs tend to handle their network installations internally. Many firms purchase small LANs of perhaps 10 nodes or less from retail stores like Businessland and Entre Computer Centers, says Brad Baldwin, LAN industry analyst with San Jose, Calif.-based research firm Dataquest, Inc. Such outlets provide installation services, but many users with small LANs from retail chains report they installed their own networks, according to a Dataquest personal computer LAN survey.

At the other end of the spectrum are companies with huge LANs connecting hundreds or even thousands of terminals and PCs to mainframe hosts and minis. Some of these firms hire their own internal experts, says Gary Kwok, manager of project consulting at the Lanquest Group in Santa Clara, Calif.

Bringing an expert on staff may be an expensive strategy. However, he notes, "by hiring someone, companies maintain greater continuity and have more control over the work." Also, after a staff expert installs a network, he has knowledge that can be applied to future installations, Kwok says.

Between the two extremes are a range of companies with varying network needs. These firms may have several small LANs or a larger network with about 80 nodes. The LANs often require more than a part-time project manager with moderate technical expertise. Yet, hiring a specialist may not be worth the money, Kwok says. These firms are likely to turn to outside LAN consultants.

Three corporate LAN users who spoke with *Computerworld Focus* say their resources and the size of their networks were the primary concerns in deciding how to install their LANs. These users represent different solutions to an industry dilemma.

Outside experts proved the best resource when TAD Technical Services Corp. in Cambridge, Mass., installed an Ethernet LAN based on a cluster of Digital Equipment Corp. VAXs, according to Timothy O'Brien, TAD's manager of computer operations. TAD, which provides temporary technical support service personnel, is the largest privately held contract engineering firm in the U.S.

In 1985, the company moved from a time-sharing service to a minicomputer cluster based on a DEC VAX-11/750 and 11/780. To link 40 terminals and two PCs to the cluster, TAD decided to use Digital's Decnet running on an Ethernet backbone because of the office's physical restrictions. "Our building is 30 to 40 years old. We didn't have enough room to

INSTALLATION TRADE-OFFS

wire back everything directly to the computers," O'Brien says.

TAD relied on DEC to plan the network scheme. However, it contracted Cabletron Systems, Inc. of East Rochester, N.H., to install the LAN and add transceivers so that servers could tap into the network. Installing the Ethernet cable requires an experienced professional because there are limitations, such as flexibility, on the cable, O'Brien says. "Because Ethernet was the backbone of our network, there was too much risk if we didn't do it right," he explains.

The LAN at Vancouver General Hospital in British Columbia, Canada, is several times larger than TAD's network. The Ungerman-Bass, Inc. baseband Ethernet LAN covers eight city blocks and connects 500 terminals, 100 PCs, 50 DEC minis, 11 Data General Corp. minis and an IBM 4381 mainframe. However, the 1,200-bed, 5,000-employee hospital has the internal resources to install such a network.

Two factors contributed to Vancouver General's decision to install its own LAN, according to Paul Rummell, the hospital's director of information systems. The first was economy, he says. "We could save money doing it ourselves." Second was the expertise of the hospital's technical staff. "We had no difficulty using people with an electrical engineering background to install the LAN," Rummell notes.

> *'Installing a LAN is a lot more complicated than meets the eye.'*
>
> **— Ian Ebel**
> **Microserv Technologies Corp.**

Vancouver General's decision to install its own LAN had an effect on its choice of networking hardware. The hospital picked baseband Ethernet over broadband Ethernet or twisted-pair wiring because baseband was easier to install and maintain, according to Rummell. Twisted pair requires more wiring, and the sheer number of cables makes it difficult to detect problems, he says.

Broadband requires tuning, Rummell says, and it has to be brought down any time the hospital wants to tap a new device into it. By contrast, he states, "We can tap into baseband while it's alive." Having a network up 24 hours a day, seven days a week is important to the hospital, he claims.

First Bank Systems, Inc. "hasn't found the right way to install LANs yet," says Donna Staats, assistant vice-president and manager of office systems planning at the bank. Minneapolis-based First Bank, the 14th largest bank in the U.S., has nine Banyan Systems, Inc. LANs, each supporting about 20 to 25 PCs, she reports. Most were installed by the bank's technical staff; one was set up by outside consultants. Neither approach proved fully satisfactory.

"We started small with two networks that were installed at the same time," Staats recalls. "My team designed the floor plan and coordinated the project." To handle the cabling, Staats enlisted electricians from the bank's cabling department and contracted for several nonbank workers. The office systems planning group then put the servers in, plugged the network cards into the PCs and moved users' files.

A senior technical manager at First Bank served as overseer of the project, Staats reports. However, the networks were only a part of his daily responsibilities, so he could only devote part of his time to the projects. Because no one was fully dedicated to the network projects, they took longer than necessary, Staats asserts. "It's incredibly time-consuming if people have to fit a project around their jobs."

The bank's newest LAN was installed by an outside consultant, but that, too, resulted in problems. The consultant, who worked almost exclusively with a designated user, did as much as he could, Staats says. However, neither he nor the user knew whom to talk to for various tasks related to the project. "For example, he didn't know who did the cabling," she notes.

Outside/in-house solution

For future LANs, First Bank will hire an outside consultant who will work with a designated technical staff member, Staats predicts. "We need an inside person who can coordinate the groups of people who install the cable, PC boards, server and peripherals."

Using a combination of external and internal resources can also work for smaller LAN installations. When Dataquest's Baldwin set up an 11-PC net for his department, he installed the server and network cards but used contract electricians to lay the cable. "Cable probably represents the hardest part of installing a LAN," Baldwin comments.

Time was another factor for Baldwin. Some of the cables had to be pulled through office partitions and the ceiling, he explains. "It took two specialists six or seven hours to install the cable and troubleshoot problems."

While Baldwin has set up several parts of his LAN, he doesn't recommend that all managers follow his lead. "I'm interested in doing it because I'm a LAN analyst," he notes. "If a company does

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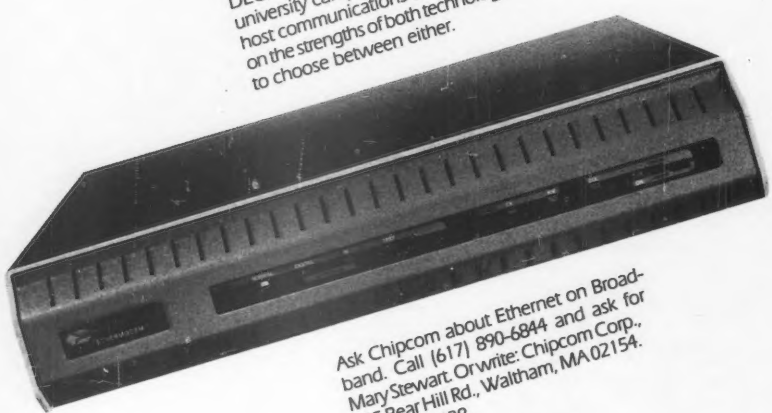

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not have a microcomputer specialist who knows how to take off a PC cover and flip the DIP switches, it should hire a contractor," Baldwin advises. "Networking is something you just don't want to fuss with."

Users who wish to hire a consultant should be wary, Microserv's Ebel cautions. "There are a lot of phonies out there because the money is good." Uninformed users are particularly susceptible, he says. One precaution managers can take is to ask potential consultants for the names of four or five network customers, Ebel suggests. View any consultant's reluctance to release customers' names as a warning sign, he says.

Managers installing small LANs may be able to use a retailer rather than an independent consultant, according to Lanquest's Kwok. "If you just want to share a laser printer, go with Entre or Businessland," he says.

Corporate users planning to set up their own networks have several issues to think about, but the most critical factors are knowledge and planning.

Training is essential

First, managers should get some training, Ebel says. "Two full days of training will give managers enough knowledge to prevent them from making a serious mistake," he says. "It will also teach them that installing a LAN is a lot more complicated than meets the eye."

Following this training session, managers should spend several weeks gaining further experience and honing their skills, Ebel asserts. "Learning to install a LAN takes a good [month-long] learning curve," he says. The investment in time is worth it because it can save a firm from mistakes. "I had one case a few years ago in which a user strung coaxial cable between buildings," Ebel notes. "It worked fine until there was a thunderstorm. Then, all havoc broke loose."

In preparing to install the LAN at Vancouver General, the technical staff educated itself by visiting companies with networks. The biggest problem for the hospital was being fully aware of the engineering requirements for Ethernet, according to Rummell.

Once users get the necessary training, the next concern is planning. "Network planning is the most complicated part of installing a LAN," First Bank's Staats says. Managers have to evaluate and choose the right LAN application, she says. They also have to see that all the system components will arrive at the same time. "For instance, we have to make sure that any PCs we order come in when the networking software does." Any time a company wants to add PCs to the network, it has to bring down the LAN, so it is best to compile all the components at once.

Make sure to follow up

Follow-up coordination is very important to a successful installation, Staats asserts. "Managers have to make sure the cable is installed properly and that it follows the floor plan," she says.

Another key step in planning is the ability to expand, according to Ebel. "LANs seem to grow far larger than anyone thinks they will." Once five- or six-node PC networks were common, he recalls. Now many LANs have 30, 40 or even 100 PCs. To provide for future expansion, managers should choose a system such as Datapoint Corp.'s Arcnet, Ebel recommends. "You may pay a little more for a five- or six-person network [with expansion capabilities], but you'll have no problems expanding."

The flexibility provided by an Ethernet backbone is an important feature for TAD Technical Services. TAD's O'Brien says, "With the backbone running through the building, we're in good shape for any future expansion." Ethernet gives the company two networking options. First, the computer operations group can tap a terminal server into Ethernet and hang terminals off the server. Second, the group can run Thinwire Ethernet, a thin version of Ethernet, from the backbone to connect nodes.

Finally, managers planning PC LANs face the dilemma of software compatibility. Many popular PC applications will not work on nets, Ebel says, but this problem is often overlooked. "People who don't know what they're doing will get the network running, but when they put an application on, it chokes." The problem is that most PC applications are written only for single-user systems, he explains. "They don't have multiuser functions such as file and record locking."

Network applications solutions are coming out of two sections of the computer industry. At the PC level, developers are introducing multiuser versions of popular applications such as Ashton-Tate's Multimate word processing package, Ebel says. Ashton-Tate has also introduced a multiuser version of Dbase II. However, Ebel comments, the Dbase version is "not that slick because the vendor is trying to make it do things it was never meant to do."

At the higher end, software developers are "hacking away at minicomputer applications" to create PC LAN versions, Ebel says. "Some of these have been done quite successfully because the minicomputer application has had five to 10 years to mature." Additionally, two years ago, vendors began specifically developing multiuser PC applications, so users have a lot of useful software from which to choose, he notes.

Managers who decide to install LANs have to balance a number of concerns, otherwise the installation will end in chaos, Staats of First Bank cautions. Yet, with experienced people and preparation, she says, "installing a LAN can be quick and orderly." F

Hurst is a Computerworld Focus *senior writer.*

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CORPORATE ACCOMPLISHMENTS

BMW Puts Network In Gear

BY · KEVIN · TOLLY

What drives a multinational automobile firm to automate its office systems? If you're BMW of North America, Inc., the thorny communications problem of tying together offices and operations in different countries and across several time zones is pursuasion enough for MIS.

BMW of NA operates across nine time zones. For this U.S. distributor of BMW brand automobiles, parts and motorcycles, daily interaction takes place between people in places as widely dispersed as Munich and Los Angeles.

By the time BMW of NA, a subsidiary of Munich-based BMW AG, opens for business at its headquarters in Montvale, N.J., it is mid-afternoon in Munich. By the time a product engineer starts the day in Los Angeles, it is already the end of the day in Munich. BMW of NA needed to automate its office systems to overcome the problems of time, distance and expense.

Prior to investigating an automation solution, BMW of NA's MIS department developed a set of guiding principles for office systems projects. The decisions were based on MIS's experience and observations of various IBM systems and strategic approaches. The guiding principles were the following:

■ IBM's Distributed Office Support System (Disoss) should be the backbone of any mainframe-based information distribution network for BMW of NA.

It was clear to the MIS department that IBM was fully committed to its Document Interchange Architecture/Document Content Architecture used in Disoss and that it would continually refine and widen the scope of Disoss. IBM's introduction of Systems Network Architecture Distribution Services, a major enhancement to Disoss, reinforced the decision by the MIS department at BMW of NA to go with IBM.

■ Disoss and associated products require technical expertise not readily available in the market. Research had indicated that BMW of NA should install the product and begin developing in-house expertise with Disoss.

The Disoss product line continues to be complex because of the variety of services it offers. At minimum, the products use more than a dozen files and dozens of programs. A system of this size always has an impact on DP operations. By starting early and slowly, the staff at BMW of NA was able to familiarize itself with Disoss and its concepts.

■ BMW of NA's task should be matched to the machine, work group processing should be decentralized, and reliance on a mainframe system and network should be reduced.

BMW of NA decided that all word processing should be done on the PC with each user responsible for his own data. The firm also determined that end-user queries and data shared within work groups would be done on a minicomputer while the mainframe would be used primarily to distribute information and supply functions not yet available on other devices.

■ The auto firm should begin installing office systems hardware as soon as possible.

MIS agreed that a departmental processor would be

PHOTO BY GEOFF O'CONNELL

CORPORATE ACCOMPLISHMENTS

needed to reach BMW of NA's office automation goals. In 1984, the firm decided to install IBM System/36 units to replace the standard remote configuration of an IBM 3274 terminal control unit and an IBM 3770 RJE printer per office.

MIS helped the cause substantially by being able to cost-justify the replacement. The System/36 was less expensive than the existing hardware, and IBM RJE software within the System/36 was much more flexible than that in the 3770. MIS was also able to offer users additional RJE functions. This ability enabled the department to get the equipment in place while finalizing and testing its long-term strategy.

With these guidelines in place, BMW of NA was able to proceed with the actual automation. To make an OA project of such scope more manageable, BMW of NA implemented its office systems strategy in two phases, one of which is completed and the other which is currently under way.

Phase I of the office system strategy, begun in mid-1984, has been in place since mid-1985. The firm's goals for this phase were to improve its communications situation and begin learning about the world of office systems.

All of BMW of NA's terminal users throughout the U.S. are now able to exchange messages and text documents using IBM's host-based Personal Services/370 (PS/370), which, in turn, uses IBM's Disoss host product. All regional and headquarters buildings are equipped with IBM Scanmasters to handle image document traffic. Because the firm's Disoss host is connected via leased line to Disoss running in Munich, text and image documents can also be exchanged with colleagues at BMW world headquarters.

Because links exist between Disoss in Munich, a BMW motor plant in Steyr, Austria, and a newly built vehicle assembly plant in Regensburg, West Germany, the company's ability to exchange information now includes these facilities. The BMW field force and traveling staff communicate either via IBM's Audio Distribution System voice mail product or by using a personal computer to dial into the PS/370 electronic mail system.

Original too clumsy

BMW of NA's MIS department had to do a great deal of work to get the basic Disoss system and PS operational. While a messaging capability was needed, the original Disoss/PS was too difficult and clumsy to use. Later releases of the product were much better.

The original Disoss/PS version also confirmed that word processing was better done on a PC using IBM Displaywrite 3 rather than PS/370. MIS and users at BMW of NA found that it would be advantageous to send text documents produced on the PC to other PC users as files or to mailboxes of other E-mail users. MIS began reaping the benefits of Disoss when it hooked its Scanmaster units into the network.

> *"MIS helped BMW's office automation cause substantially by cost-justifying the replacement of existing equipment with System/36s."*

The biggest automation payoff came in 1985 when BMW of NA networked its Disoss with the Disoss running at BMW Munich.

In 1986, the addition of a few table entries to the New Jersey host Disoss allowed BMW of NA to expand its communications possibilities by interfacing with the Personal Services/36 (PS/36) E-mail systems on the System/36 and through the System/36 to reach the PC.

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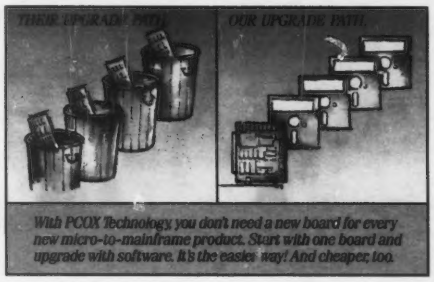

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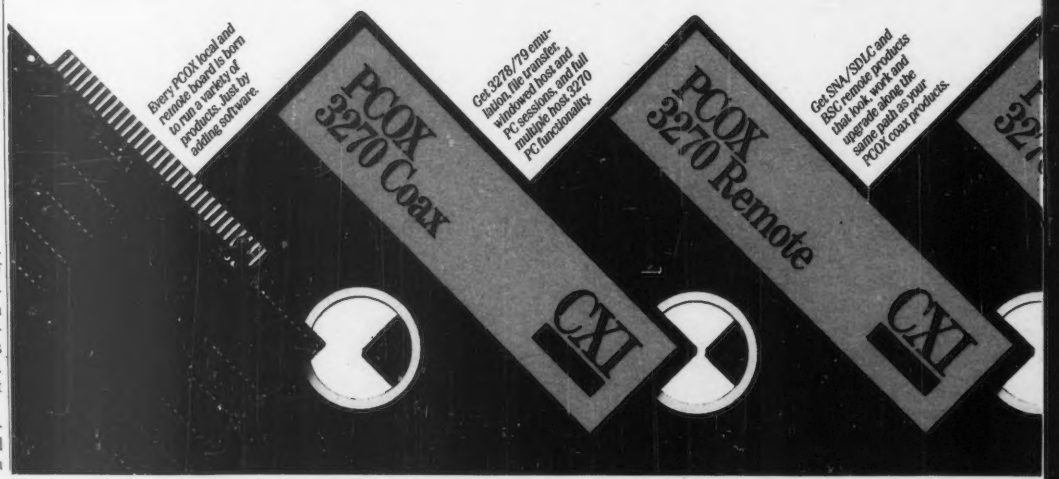

CORPORATE ACCOMPLISHMENTS

was the installation of Scanmasters at all company locations in the U.S. Although users received only limited training, the Scanmasters have been successful. Their ease of use, quality of output and distribution list features won people over. From the viewpoint of BMW worldwide, the company also saved money on line costs because the Scanmasters were attached to an existing leased-line network.

From the outset, BMW of NA incorporated each persons' E-mail and Scanmaster user identifications into the corporate telephone directory. Lately, with the emergence of communication with users on BMW office systems in West Germany and Austria, BMW worldwide has seen the need for a machine-readable directory that can be distributed among all nodes of the network.

Phase II of BMW's office automation process was developed and tested in 1986 and is expected to be fully implemented in 1987. By integrating the features and functions of IBM's System/36 into its office systems network, the firm hopes to increase dramatically the power of the office systems it offers.

Send PC files anywhere

Building upon the Disoss backbone network already in place, BMW can now send PC files anywhere in its national and international networks using IBM PS/36.

Until such time as Disoss supplies a utility to simplify the task of distributing mainframe data over Disoss, BMW of NA says it plans to use IBM's Distributed System Executive (DSX) for the function. The firm will download predefined parcels of mainframe data to one or more System/36s.

The company's file format will be defined by the IBM Interactive Data Definition Utility (IDDU) at the System/36 and will be used immediately via IBM Query/36. Because the firm also plans to use IBM PC Support/36, the user will be able to invoke the Source Transfer Facility feature of that product to select and download a subset of the data to the PC.

The PC-System/36 connection will also offer BMW of NA the advantages of a virtual local-area network. PCs hooked to the 36 will be able to use the Virtual Disk Facility of PC Support/36 to share PC disks that physically reside on the System/36.

By using the Virtual Print Facility, the company will be able to share expensive laser printers among all users of a System/36.

Not yet for common use

Although the MIS department prefers to use Disoss for distributing all human- and machine-readable information, the interface between Disoss and other mainframe applications is still too complicated for common use. The current Disoss application program interface runs only under CICS and has no command-level interface — the user must call assembly language routines with a parameter list pointing to control blocks.

In place of this, MIS selected DSX. While DSX is not as flexible as Disoss, mainframe batch data can be loaded into DSX relatively easily and then DSX automatically downloads to one or more System/36 units. The format of the mainframe data can be defined to the System/36 by using the IDDU. Once the data is loaded and defined on the System/36, the user can choose either to process the data on the System/36 or to download part or all of the data to a PC.

On the System/36, the user will have available the full functions of the Query/36 product. If data is needed for a PC application, the PC Support/36 feature — the Source Transfer Facility — will be invoked to select and download data to the PC. This facility will also provide the EBCDIC-to-ASCII conversion needed when moving data from the System/36 to the PC.

The output on the PC can be specified as ASCII text, Microsoft Corp. MS-DOS random format, IBM Data Interchange Format or various Basic formats. The data downloaded to the PC can either physically be written onto a PC disk or it can be written onto a virtual PC disk on the System/36.

When the PC readable data is stored on the System/36 virtual disk, it is available for authorized use by all PCs attached to the System/36.

Shield the user

While all of the above works quite well, the user must be shielded from the complexities

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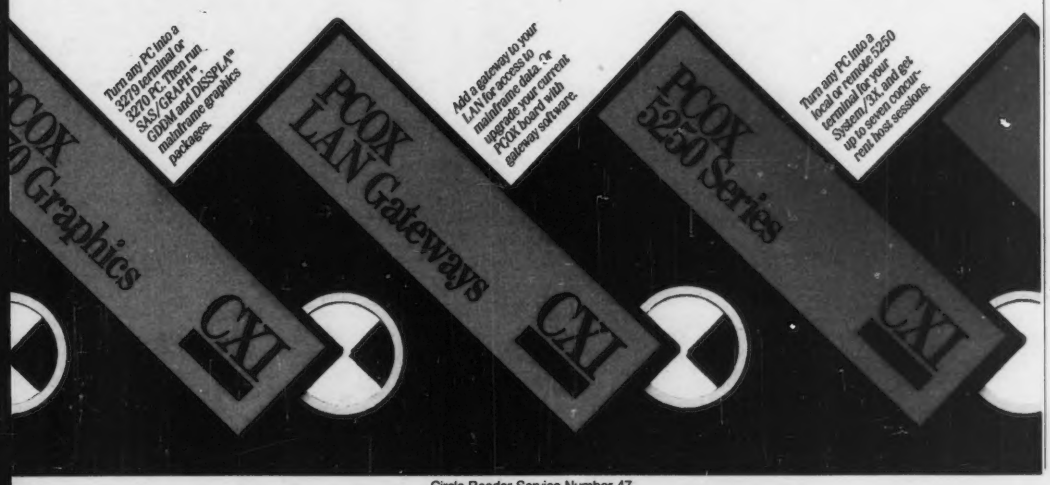

Circle Reader Service Number 47

of this configuration. MIS at the company plans to supply customized System/36 panels and PC batch files (command lists) to execute the data download and transformation functions. New features available in Release 5 of the System/36 software will make downloading and using virtual disks even easier.

The DSX product and the above scenario function equally well for data upload. Any PC data can be moved first to the System/36 and then to the mainframe.

Additionally, DSX is an important product for System/36 support staff because by using the product, System/36 libraries and files will be maintained centrally and distributed via DSX.

Because almost 100% of BMW of NA's word processing currently takes place or will take place on a PC using IBM Displaywrite 4, it is important to be able to take documents produced on PC Displaywrite and distribute them via Disoss. MIS plans to accomplish this by taking advantage of the integrated PC-System/36 functions to move documents from the PC to the System/36 and then establish a link between the host Disoss and PS/36 to distribute the document over the mainframe Disoss network.

> *Initial and ongoing training are very important for office systems. If an organization has a large users group and a small office systems staff, training could prove to be the most difficult part of the whole job.*

The user can send the document in a form that all Disoss-based systems can view (Final Form Text), in a form that can be processed by all products in the Displaywrite series (Revisable Form Text) or in its raw personal computer form for delivery to another PC-based Displaywrite 4 user.

Now, any PC file can be transferred to a System/36 virtual disk and then shipped over the Disoss network intact. A distribution list can be used to send the same data parcel to many users.

MIS at BMW of NA used Phase I to deliver enhanced communications to its users and also to learn firsthand about the critical aspects of office systems. MIS managers should note that the decision to install a system like Disoss or a minicomputer-based system like the System/36 can change the complexion of an MIS department.

Disoss requires substantial data management from a data base administrator and has a long learning curve for a system programmer. Although Disoss uses VSAM files, it functions logically as a data base with records on one file pointing to records on other files. If one file is lost, a programmer may be forced to rebuild the entire system.

Grappling with LU6.2

MIS managers who plan to use either Scanmasters, Disoss-to-Disoss or Disoss-to-PS/36 communications, take note: Your CICS system programmers will have to grapple with IBM's LU6.2 protocol.

LU6.2 is not difficult to use, but like anything else being used for the first time, research and extra effort are involved.

If an MIS manager elects to install System/36s as office systems, he will also be faced with a learning situation. While the System/36 is easy enough to generate and use, it is so completely different from MVS/XA and DOS/VSE that several months are required to make the adjustment and to understand what is going on inside the System/36.

BMW of NA's MIS learned a lot about its user base in Phase I. It is likely that in a typical company no other system will be used as much as an office system. Initial and ongoing training are very important.

If a firm has a large users group and a small office systems staff, training could prove to be the most difficult part of the whole job.

During Phase II, MIS at BMW of NA will be able to use the knowledge gained during the past several years to expand upon the software and hardware already in place. The Disoss distribution network, in place for several years, now carries PC files as well as PS/370 messages.

As the momentum with office systems grows in BMW AG in Munich, more and more telex and facsimile document traffic will be eliminated and the use of Disoss-based E-mail and image distribution will increase.

BMW of NA's initial investment of time and money has been made; the payback is growing daily.

Tolly is manager of technical services, telecommunications and office systems at Montvale, N.J.-based BMW of North America, Inc. He has been with the automobile distributor for three years. Tolly has a degree in classical guitar performance from Hartt College in West Hartford, Conn.

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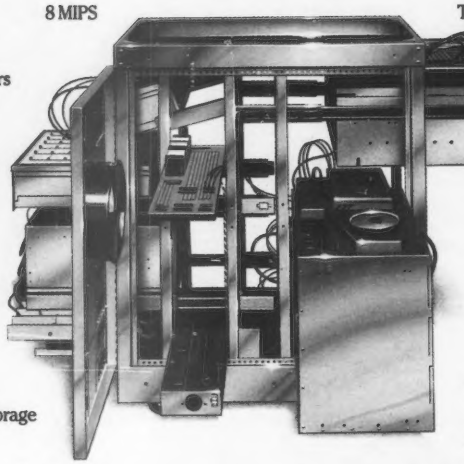

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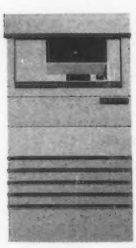

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GATEWAY ALTERNATIVES

Overcoming Barriers Through Gateway Technology

BY · STAN · KOLODZIEJ

This might just be the year of the local-area network (LAN). Bear in mind, however, that almost every year recently has been declared the year of the LAN, without much result.

PC-based LANs are predicted to grow at an average compound growth rate of more than 40% during the next five years, equaling a dollar value of $9 billion in 1990, according to Future Computing, Inc., a Dallas research firm. The company further predicts that LAN sales will climb from 72,000 in 1985 to almost 1.1 million in 1990. Not bad for an industry that until recently was marked more by bluster than by actual sales.

Where there are more LANs, there will also be more LAN gateways.

A point of clarification: Gateways are defined as data links connecting dissimilar computing environments. For example, a gateway could link a LAN to an IBM 3090 mainframe on IBM's Systems Network Architecture (SNA) network.

A bridge, another LAN-related term that causes some confusion in the market, has come to signify a data link between two similar LANs generally using the same transmission medium such as Ethernet. Bridges operate at the lowest level of network architecture (physical and data links). They are sufficient to connect a few small networks but do not contain the higher level network management, control and reliability features that are required in LANs.

"Gateways usually imply some sort of necessary protocol conversion," according to Mike Katz, product manager at Proteon, Inc., a Westboro, Mass., communications firm. "As the market has matured, 'gateway' has also come to mean a communications bridge, which is technically incorrect."

By far the most active area in the gateway market is in connecting LANs to corporate mainframes. In a sense, gateways are extended versions of micro-to-mainframe links. The latter connection is usually handled by going from the mainframe through some front-end processor then via telephone lines to an IBM 3274 or 3174 cluster controller. Attached to the controller are IBM 3270 series terminals or, more likely now, IBM Personal Computers and compatibles equipped with add-in boards providing 3270 emulation.

LAN gateways, however, generally select one of the PCs on the LAN to act as a kind of substitute cluster controller. This "gateway" PC carries the hardware and software needed to emulate the cluster controller. Because the PC is part of a LAN, every other PC on the network is already wired into the emulation board, in effect making the gateway PC the conduit through which the networked PCs communicate with the mainframe.

In this scenario, the gateway can even handle terminal emulation, eliminating the need for individual PCs in the network to carry their own 3270 emulation boards. The result is a fairly elegant micro-to-mainframe solution, eliminating much of the extra hardware necessary for most stand-alone micro-to-mainframe communications. As a bonus, this solution also offers cost savings.

Savings become a matter of basic arithmetic. IBM 3274 cluster controllers cost about $10,000 each. Individual PC emulation boards run about $1,000 apiece. Add to that the cost of cabling or hard-wiring the PCs to the controllers. If MIS is configuring 30 PCs through cluster controllers, the cost could easily run about $45,000.

By contrast, the cost of a gateway PC could be half that of a cluster controller — about $5,000 — while the average LAN PC node or unit cost has been slowly decreasing, down

JEFF MOORES ILLUSTRATION

now to about $500 to $600 per node. Providing mainframe access to those 30 PCs from a LAN rather than a stand-alone environment cuts the cost by roughly $20,000 or more. Add extra savings through the elimination of many hard disks on PC LANs and the consolidation of data storage on only one or two PC hard disks. Share other resources on the network, such as printers and other peripherals, and save even more money.

Looking at it another way, a company could nearly double the number of people getting mainframe access with PC LAN gateways instead of stand-alone micro-to-mainframe methods.

Costs still too prohibitive

However, some observers say LAN costs are still too prohibitive and will have to come down in price to really spur sales of LANs and LAN gateways.

Most of the LANs available during the past five years were designed to connect mainframe or minicomputers with micros to provide shared resources and distributed data processing in a large system environment. These high-end LANs are relatively few in number, operate at one million bits per second or better transmission rates and still can cost up to $1,000 per workstation. Research also indicates that the average LAN incorporates only six nodes.

Many users, Katz adds, do not want to commit to a costly networking solution but still have an immediate need to share data, printers, modems, hard-disk storage, mini or mainframe host computer connections or peripherals such as protocol converters. Though network node costs have come down, many think they are still too expensive compared with the original price of a stand-alone micro.

> *As LANs increase in size, dedicated servers will play a larger role as gateways.*

International Data Corp. (IDC), a market research firm located in Framingham, Mass., sees the market changing as a result. IDC predicts that low-cost, entry-level systems, at a price per network node of one-fifth to one-tenth the cost of the workstation to which it is attached, will represent the fastest growing market until the end of the decade. Simply put, cheaper LANs will mean more LAN and gateway sales.

In the meantime, companies like Avatar Technologies, Inc., Novell, Inc. and others are helping LAN and LAN gateway sales by supplying less expensive programmable interconnect devices acting as cluster controllers designed to link IBM PCs and peripherals at a much lower one-time cost per workstation attachment of about $200.

As the per-node cost of LANs decreases, LAN installation size will increase. Many larger LANs require that all or part of a microcomputer or hard disk in the network be dedicated to managing network traffic.

These devices are known as servers, and some LAN vendors sell them as a required part of the network, with the server generally costing between $8,000 and $12,000. As LANs increase in size, dedicated servers will play a larger role as gateways.

Networks' increasing size, their ability to run sophisticated multiuser software and to connect to other networks will drive the need for more powerful file servers.

In this scenario, dedicated IBM Personal Computer ATs used as gateways will simply not have the CPU horsepower, memory or built-in communications support to handle the necessary data throughput and format conversion.

PCs replacing terminals

Due to these changes, more corporations are replacing terminals with PCs for accessing mainframes. "With a growing population of micro users demanding mainframe accessibility, [and] more user-friendly, sophisticated terminal emulation and file-transfer packages appearing on the market as well as a steady growth in LANs and the beginning commoditization of the PC, the personal computer is becoming a prime contender for 3270 business," an IDC report reads.

Don Wszolek, vice-president of marketing and sales for Multi Soft, Inc., an Edison, N.J., communications firm, says micro-to-mainframe link products currently fall under the categories of basic file transfer, proprietary links and generic link products that can extract data from many different data base protocols.

"There is a need with LANs, just as there is with stand-alone link products, to get products that will download data and relieve a good deal of the application development work load from the host. We're finding a lot of our customers now leverage costs by attaching several PCs to a host through LAN gateways instead of going stand-alone or with terminals," Wszolek says.

Another boost has come from IBM's emerging commitment to tie its Token-Ring Network to SNA and the increased push by PC LAN vendors to make their products IBM Netbios compatible.

Together, these elements have created a more stabilizing effect in the PC LAN industry, which has helped push LAN sales and given MIS the green light it needed to proceed with the installation of LAN gateways into SNA environments.

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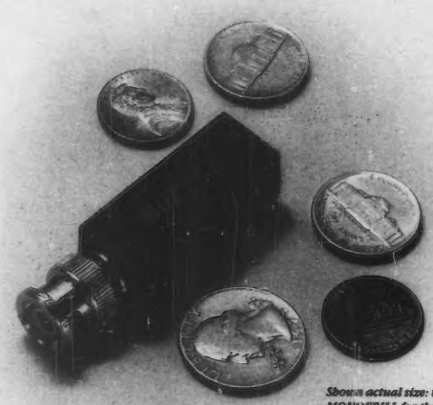

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GATEWAY ALTERNATIVES

"People are interested [in gateways], but it won't be until six or nine months into 1987 before they will be making gateway decisions," explains Ilene Goldman, an IDC analyst. IDC estimates gateway shipments will represent 13% of the total 3270 dollar value, but that percentage will jump to 48% of the total 3270 shipment market by 1990.

Gateways are appearing in all shapes and sizes. For example, Gateway Communications, Inc. of Irvine, Calif., provides several kinds of gateways, including one that links any Novell Netware-based LAN with IBM's SNA environment over X.25 transmission lines, eliminating the need for expensive dedicated leased lines. According to Gateway Communications, one of the major benefits of its X.25 gateway is the ability to bypass IBM cluster controllers because the gateway logic rests instead in a PC LAN.

The 3711 Gateway from Interlink Computer Sciences, Inc., headquartered in Menlo Park, Calif., provides a link between Digital Equipment Corp.'s Decnet network and IBM's VM and MVS operating environments.

"The 3711 is giving us electronic mail between [IBM's Professional Office System] and [DEC's] All-In-One," explains Frank Pater, program manager for corporate electronic mail at Seaford, Del.-based Du Pont Co. "I think there's a need in a lot of companies to have DEC users access the MVS world. It's growing."

Lambert Onuma, chief executive officer and president of Interlink, says he sees a burgeoning customer demand to connect applications across diverse operating environments. "Ninety percent of Fortune 100 corporations have standardized on IBM and DEC," Onuma explains. "They have to connect their computers, and they want it done painlessly, without incurring support costs. The more applications they want connected, the more gateways are going to be sold."

Cooperative application development

Multi Soft's Super-Link is a gateway product that is trying to penetrate another growing market — cooperative application development between mainframes and micros. Using IBM's LU2.0 transmission protocol as a base, the gateway, called Cooperative Peer-to-Peer Communications (CPPC), provides a protocol layer between many third- and fourth-generation-based data bases and LANs. Multi Soft targets users such as Hilton Hotels Corp. and Dun & Bradstreet Corp. that have a need for concurrent application development at remote locations.

"It's not just the heavy transaction-oriented corporations that are interested in this," Wszolek explains. "Cooperative processing through gateways is going to be the way for any large corporation."

A more traditional gateway approach is Digital Communications Associates, Inc.'s Irmalan DFT gateway, a facility that enables IBM PCs to plug into IBM's Token-Ring Network, in effect emulating IBM 3278 terminals.

Ungermann-Bass, Inc.'s recently introduced board-level 3270 network interface unit, called NIUPC, enables IBM PCs and compatibles to run micro-to-mainframe applications from the company's Net/One LAN.

According to Darrell Miller, director of marketing at Ungermann-Bass, "Several micro-to-mainframe applications are written to Irma or IBM adapter card hardware and not an industry standard software interface. Previously, users had to buy both the Digital Communications Irma coaxial card and the IBM coaxial card to run applications like Lotus Development Corp.'s Symphony Link, McCormack & Dodge Corp.'s PC Link and IBM's PC/VM Bond."

Another growth area in gateways is the use of LANs as backbone networks. Backbone networks provide utilities to connect multiple system and application-specific LANs into a common and managed network. Most of the activity here, however, comes after multiple networks are installed. The backbone networks can then be used to access and manage multiple network resources.

The Proteon P4200 gateway, for example, interconnects smaller LANs within a building to Proteon's Pronet-80, an 80M bit/sec. token-ring backbone network. "The gateway is really a router that supports multiple networks and multiple communications protocols," Katz says. "It's a network integrator."

Gateways link New York schools

The P4200 is being used at New York State Education and Research Network, Inc., a New York-based networking consortium currently linking 15 universities in the state for the purposes of mutually providing research and educational data.

The data hub of the consortium is the Cornell University Supercomputer, a hybrid machine consisting of an IBM 3090 mainframe and five Floating Point Systems, Inc. array processors.

According to Bill Schrader, networking consortium president, a Proteon gateway is situated at every member site. The gateways support the Transmission Control Protocol/Internet Protocol (TCP/IP) standard and Ethernet baseband technology for channeling data back and forth at 56K bit/sec. via T1 lines through intra-Local Access and Transport Area links and into other subscribers' LANs.

"As long as the subscribers' LANs can talk to TCP/IP and use Ethernet, we don't care what kind of other equipment [the subscribers] have," Schrader says.

"The main point is that people are not going to standardize on only one LAN technology," Proteon's Katz concludes. "There is a real need for third parties to integrate de facto [LAN] standards. That's why gateways are going to become important in the next few years."

Kolodziej is Computerworld Focus *senior editor.*

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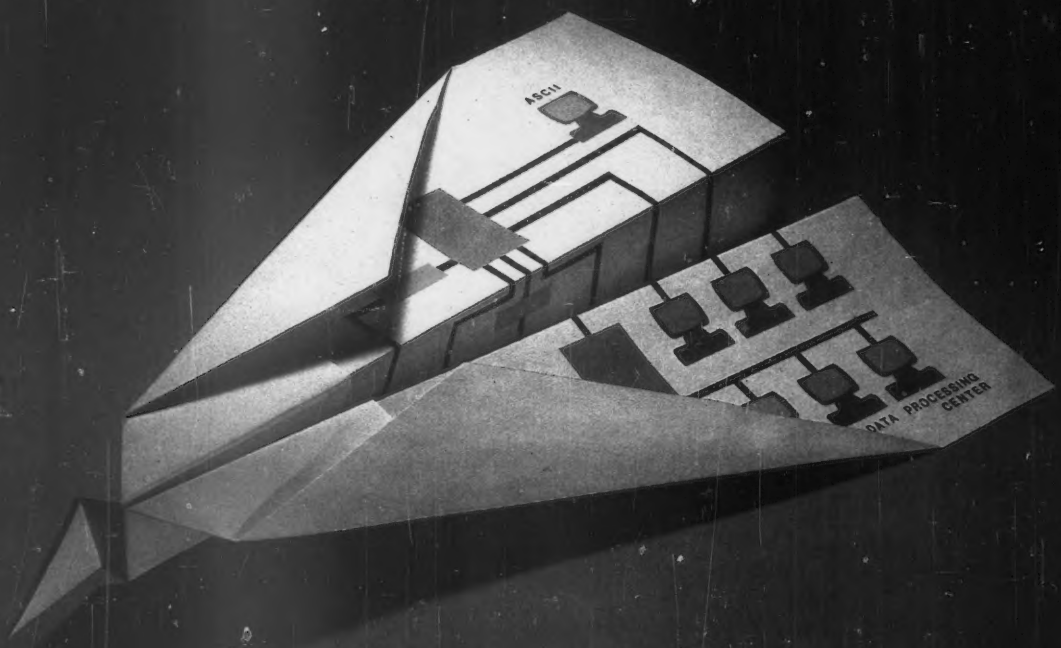

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DBMS FORECAST

The Hunt For Distributed DBMS

BOB DAHM ILLUSTRATION

BY · REBECCA · HURST

Distributed data base management systems offer a lot of promise. For one thing, they allow MIS managers to keep their eggs of wisdom in more than one basket. DBMS vendors are also offering a lot of promises. Yet the management software responsible for protecting corporate data has not been tightly woven into a fully developed system.

Moreover, users are not clamoring to spend their money on distributed DBMS, notes Dale Peacock, a senior associate editor at Delran, N.J.-based Datapro Research Corp. "A lot of people are talking about distributed DBMS, but very few are implementing them," he explains.

The most talk appears to be coming from the vendors. Several software developers have either announced distributed DBMS or their intentions to introduce such systems later this year. In part, Peacock suggests, vendors are attempting to renew interest in mature DBMS products that have been available for years. "Vendors will jump on anything new that can revitalize the market," he says.

Two other motives for the interest in distributed DBMS by software developers come down to timing. One, vendors want to say that they came out with a distributed DBMS first, Peacock says. They want to point to their greater experience with the product. Two, software developers are using the product introductions to educate users and prime them for distributed DBMS purchases in the future.

Despite these apparently self-serving motives, vendors are responding to the changing demands of corporate users, analysts agree. Distributed DBMS are a response to the push for management to move from a centralized computing system to a decentralized one, explains Marty Gruhn, vice-president of the Sierra Group, a Tempe, Ariz.-based consulting firm. "With distributed processing comes a need for distributed software," Gruhn says.

In fact, the four main reasons for moving to a distributed DBMS are the same as those for moving to distributed processing, says Bernard Plagman, a partner in the New York offices of Price Waterhouse & Co.:

- Users need faster and easier access to time-critical information.
- Improved communications technology for both hardware and software is making it easier to connect computers.
- The decreasing cost of hardware for processing and storage is making it more affordable to add new systems.

DBMS FORECAST

■ The cost of transmitting data is rising. Therefore, it is often cheaper to use data on a local system rather than pulling data from a mainframe host.

Despite the advantages of distributed systems, distributed DBMS will not begin to take off in corporate environments for at least a year. For one thing, most of the few products available are not yet full distributed systems. "The concept is there, but the initial releases of these products are rudimentary," Peacock explains.

Plagman suggests that one way users can determine whether a DBMS can support a distributed data base is to match it against the specifications set in a 1982 Codasyl Systems Committee report titled "The Framework for Distributed Database Systems."

According to the report, which Plagman coauthored, a distributed data base system requires the placement of a data base or portions of a data base in a network environment. The data base can be partitioned — that is, broken down into pieces stored on various nodes of a network — or it can be replicated on various systems along the network.

No simultaneous updates

Many of the distributed DBMS products available can put different data bases on nodes of a network, but the DBMS management software cannot automatically handle simultaneous updates.

For example, distributed DBMS such as Relational Technology, Inc.'s Ingres Star can provide location transparency, reports Anthony Schaller, manager of systems development at Carnegie-Mellon University in Pittsburgh, which is beta-testing Ingres Star. Location transparency allows users to retrieve information without knowing where it resides on the network.

However, Ingres Star only allows users to update data at a single site on the network, Schaller says. In the second phase of the distributed DBMS, Ingres Star should be able to handle multisite transactions, he predicts. This capability will allow Ingres Star to provide a true distributed data base.

For example, with multisite transaction, the DBMS should be able to update a data base screen split across two nodes, Schaller notes. If one node goes down while a user is updating the screen, he says, the software will manage the transaction so the user does not have to worry about it. "It will only cause a problem if the user has to retrieve information from the system that is down."

Vendors will take about two years to introduce full distributed DBMS products, Sierra Group's Gruhn predicts. "Software developers could create a DBMS from the bottom up," she says, "but users reasonably expect to migrate from their current DBMS." Therefore, vendors are trying to move their existing data bases forward.

However, converting a DBMS into a distributed system is a complex issue, Gruhn claims. Vendors must change the core management capabilities of the DBMS because the software simply was not designed to manage pieces of a data base partitioned across several nodes of a network.

Some of the first DBMS products are coming from Unix-based DBMS vendors such as Relational Technology and Oracle Corp. One explanation for this is that vendors are capitalizing on Unix's strength in distributed computing systems and its ability to run on everything from micros to mainframes.

Another strength, Gruhn says, is that distributed DBMS may be easier to manage on Unix because AT&T built several communications capabilities into the operating system. Other operating systems were not structured for these functions, she explains.

The lack of a fully distributed DBMS is one reason why users hesitate to buy such products, but users are also not buying because they are not ready to use them. Firms are just beginning to decentralize their information processing by developing distributed systems.

Until the hardware is in place, though, there is little demand for the software. "If your single data base meets your needs, why make it harder on yourself by installing a distributed one?" asks Carol Meerson, administrative systems analyst for Earlham College in Richmond, Ind.

While few corporate managers are buying DBMS software today, purchasing trends suggest that they will in the future. In a Sierra Group survey of 477 MIS managers (see chart this page), 47.5% indicated that they would purchase DBMS packages in 1987. Among those buying packages, 62.9% said they would purchase DBMS for personal computers, while 44.1% said they plan to acquire DBMS for their mainframes.

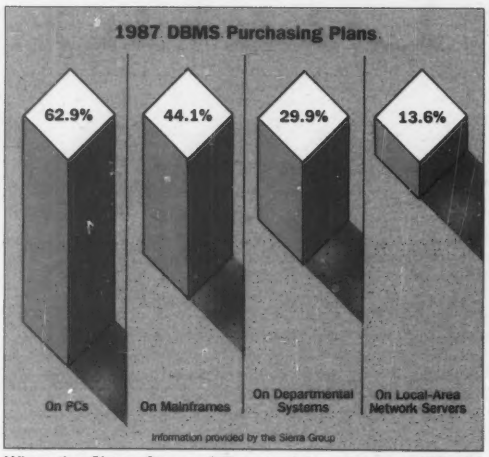
A natural result of these purchases is that PC and mainframe DBMS users will want to exchange information with each other transparently, paving the way for distributed DBMS, the Sierra Group's Gruhn says.

In addition to the corporate managers' purchase plans, Plagman lists four basic characteristics that contribute to an organization's decision to purchase a distributed DBMS:

■ With the lower cost of hardware, users may find it less expensive to purchase five smaller computers instead of one large system.

■ The increasing use of communications is making it too expensive for organizations to rely solely on central processing.

■ It is safer to keep duplicate data bases because, in the case of a serious computer malfunction, the machine will not destroy the only existing copy.



When the Sierra Group of Tempe, Ariz., surveyed 477 MIS managers about their 1987 purchasing plans, 47.5%, or 227, of them indicated that they will buy data base management system software for a variety of machines.

■ Increased dispersion, particularly among multinational companies, is making it more difficult for companies to maintain centralized DP.

Already, some organizations, out of a need for cheaper processing or access to disparate computer systems, have begun beta-testing commercial distributed DBMS packages.

Driven by economy

Economy is the primary motivation behind Earlham College's decision to use Oracle's SQL Star distributed DBMS, Meerson says.

In mid-1986, Meerson realized that the college's data base applications were outgrowing the capacity of the Digital Equipment Corp. VAX-11/750 supporting them. "I figured that we could take two routes," she says. "We could go with a hardware solution either by installing Oracle on another 750 and connect the two with Decnet or by replacing our 750 with a VAX 8600," Meerson explains. "Or, we could get PCs to carry the burden of running Oracle screens and SQL Calc software, [two components of the Oracle DBMS]."

Distributing some of the Oracle DBMS software on PCs did not appear to be a viable solution until Meerson attended an Oracle conference in San Francisco and saw SQL Star demonstrated.

Meerson considered SQL Star as an economical solution that would allow Earlham to add users "without bringing the system to a crawl." In October 1986, Earlham received an alpha release of the product.

The college is currently testing SQL Star on a DEC Microvax connected to the VAX-11/750, Meerson says. "We won't bring it to production until this summer. It's too complicated to bring a new system up during the school year." Meerson is happy with what she's seen so far, though. "We see the most difference when we have 10 to 12 screen users," she says. "Some of those screens are huge, running eight to nine pages. When we put the screens on the PCs, our resources really speed up."

As a result, Meerson says, she plans to add users to the data base system, a strategy she would not have considered before.

"We may add the bookstore to our data base system for the next fiscal year," she says.

Unlike Earlham, the need to connect different data bases, not cost, drove Johns Hopkins Hospital to develop its own DBMS, according to Steve Tolchin, the hospital's technical director. The hospital has data bases containing patient information, he explains. Many of these DBMS have to provide data that is consistent across a number of systems, including IBM mainframes, DEC minis and Unix computers.

The hospital has been using Relational Technology's Ingres DBMS to develop many of its applications, Tolchin notes. However, it also uses IBM's IMS DBMS and Mumps, an ANSI standard language. Two years ago, Johns Hopkins decided to connect these disparate systems, but no commercial product was available.

Out of necessity, Tolchin recalls, the hospital technical staff built its own data base transaction system, which has since been dubbed JH Star. JH Star is not a true distributed DBMS, he says. Instead, it is a system based on remote procedure calls that provides services similar to those of a DBMS. "JH Star allows users to send transactions between different systems and propagate updates of data in heterogeneous sites," he says.

In search of greater data base management capabilities, though, Johns Hopkins began testing Sybase, Inc.'s Sybase DBMS in October 1986. Unlike other DBMS he looked at, Tolchin says, "Sybase can act as a distributed data base manager for Sybase data bases, but it can also forward transactions to other sites."

Sybase sends these transactions via remote procedure calls similar to JH Star. As a result, the hospital plans to replace some parts of the JH Star distributed system with Sybase and simply add the DBMS to others. Tolchin says the hospital will also use Ingres.

Johns Hopkins has Sybase running on Sun Microsystems, Inc. workstations on Ethernet, Tolchin reports, but he expects to install a production release by April.

Carnegie-Mellon's system

Much like Johns Hopkins, Carnegie-Mellon University is looking to distributed DBMS to provide an exchange of data among the campus's several thousand computers. These systems are linked together on a campuswide network that combines Ethernet and IBM Token-Ring, says Anthony Schaller, manager of systems development.

Carnegie-Mellon is testing Ingres Star on a Microvax connected to a VAX-11/780; the school will gradually extend Ingres Star to other systems, Schaller reports. "We plan to build an early knowledge of distributed DBMS so that we can act as soon as it's reasonable to do so," he explains. In this way, Carnegie-Mellon will be three to five years ahead of most organizations, he says.

In the future, Schaller says, Carnegie-Mellon's administration information system will be more effective if it supports the distributed operations of the university. "Essential data will be kept on the mainframe," he predicts. "Other data relative to certain areas will be kept on a local system."

More important, users will be able to access data from any machine while remaining in the environment they are most comfortable with, Schaller says.

"If someone is comfortable with Unix, then that user should be able to work with the data in Unix," he says. The key aspect of this benefit is that it brings information within a user's grasp, something true of all distributed DBMS.

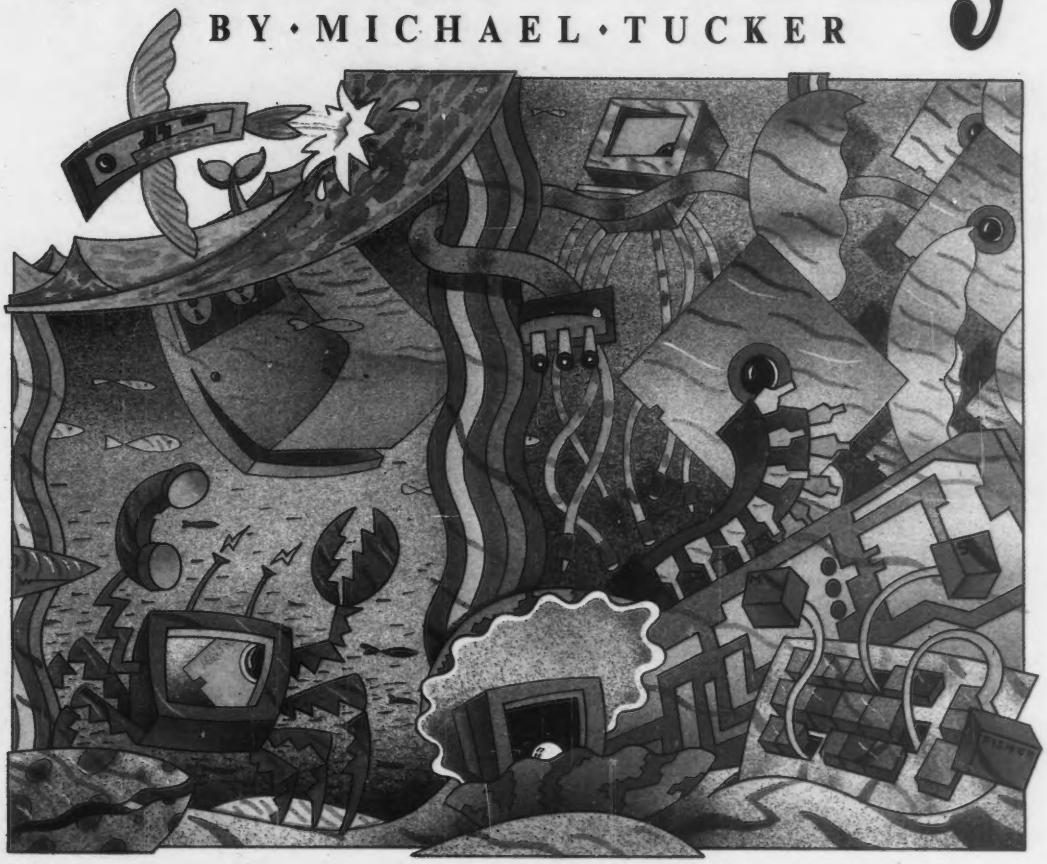
"Instead of bringing the users to the information," he says, "we'll be bringing the information to the users." F

Hurst is a Computerworld Focus *senior writer.*

SPECIAL SECTION

Connectivity

BY · MICHAEL · TUCKER



Will the future of connectivity hold stormy seas or smooth sailing for MIS? Users, analysts and vendors go fishing for answers.

Connectivity. Users are demanding it. MIS is screaming for it. Vendors, at least those that wish to survive, are scrambling to provide it.

But while everyone knows what connectivity can do *for* MIS, it's far less clear what connectivity will do *to* MIS.

Consider the following scenario: Analysts and industry observers now generally believe that while serious technical problems remain to be solved, universal (or nearly universal) connectivity is eventually going to happen. The pressure from customers, users and vendors alike is now so intense that no one, not even IBM, can resist. In the end, the pundits say, every piece of computing equipment will be able to speak to every other piece of computing equipment. And, they say, the MIS profession will be changed fundamentally and forever.

How will MIS change? The standard scenario analysts propose is that universal connectivity will usher in an age of distributed computing. Applications will run on networks of processors temporarily pressed into service for the purpose of that particular application.

In turn, MIS workers will become postindustrial plumbers. Their business will be making certain that the right information was piped to the right places. Meanwhile, end users will come to regard whatever processor they happen to have on hand with increasing indifference — just as they already hardly care what sort of tap they have in their bathroom or kitchen, so long as water continues to come out of it.

This model is a reasonable one for the future. But being reasonable does not mean it is also right.

To find out if the future DP industry and the theoretical model

MARK FISHER ILLUSTRATION

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milestone: using LAN technology to give PC users total computer connectivity. UNA will make it possible for computers of all kinds to seamlessly communicate and share data with each other.

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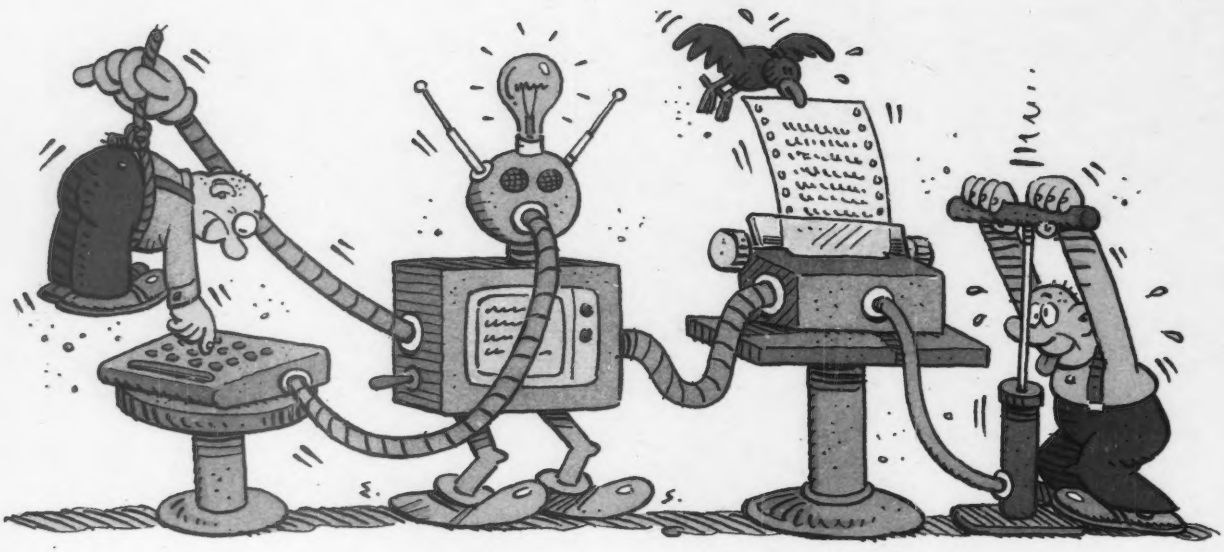

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Connectivity

proposed previously have any connection, *Computerworld Focus* recently asked vendors, users and analysts their opinions of this scenario. We expected these business people to reject the forecast on the basis that it was too radical, but they surprised us. They did reject the forecast, but not because it was too radical. They rejected it because many of them said it was not radical enough.

Will Zachmann, vice-president of research for market research firm International Data Corp. in Framingham, Mass., and John McCarthy, research manager for Forrester Research, Inc. of Cambridge, Mass., both say they feel the universal connectivity theory is flawed, but they differ on the degree.

Zachmann is by far the harsher critic. In general, he says, connectivity is an overrated issue. "Technologically, connectivity is easy. In terms of wires, there isn't a problem. Where there *is* a problem is that in most MIS installations, you've got a baroque environment consisting of a mix of incompatible architectures, which characterizes IBM's product lines."

Zachmann says he feels the problem will be solved eventually, but the solution will greatly alter the nature of MIS operations. "What's the difference between your scenario and managing a mainframe? Not much. Maintaining the integrity and security of data is already part of what MIS does," he explains.

Desktop system's importance

In addition, Zachmann objects to the idea that users will become increasingly indifferent to the kind of processor they have on their desk. "I think the way that things will develop is that the normal model will be the personal computer. The desktop system will be the important thing, and everything else — mainframes, minis, multiuser micros — will connect to it as a resource."

Forrester's McCarthy does not reject the proposed universal connectivity scheme, but, he says, the forecast is incomplete. "I agree, but I think there are some pieces you've left out. Specifically, the MIS officer in the future will be far more concerned with business details," McCarthy states.

McCarthy says he believes that processing and applications development will move away from MIS toward departmental officers. "We call this 'Theory D,' for the distribution of resources. PCs, local-area networks (LAN), multiuser micros — all of those are pulling resources away from MIS."

But, McCarthy says, that does not mean MIS officers will simply become information plumbers. "The MIS officer will become the chief networking officer — the CNO." He envisions this new corporate staff member providing information to everyone in the organization. As such, this person will have to be versed in the data needs of every discipline required in the modern corporation.

"He'll be a very renaissance-type of guy. He'll have the old MIS technical expertise, but he'll also be involved in business details," McCarthy explains.

However, Forrester's McCarthy qualifies this glowing vision of the future of renaissance MIS officers and CNOs with a stern warning. MIS officers will not obtain the promised land, McCarthy says, if they do not adapt to the realities of networking. "They are not going to be very popular if they keep pushing micro-to-mainframe links. If they don't offer real networking soon, users will just go around them. They'll install PC LANs the way they installed PCs in the first place. If MIS ignores user demands, then MIS will be a sinking ship."

The Apple Of Business's Eye

The Apple Computer, Inc. Macintosh has had an unfortunate history. It was introduced at the wrong time.

Despite the fact that its user interface was universally admired and it was years ahead of its rivals, the Mac came to market just after the IBM Personal Computer did. Mac bashing became a popular pastime in the industry. Critics said it was not a business machine, it was not open and it did not have the horsepower required by a 'real' computer.

It didn't help matters that Apple was also suffering from internal political problems that finally resulted in the eviction of Mac's main patron, Steven Jobs, from the firm.

Hanging tough

But, despite all the bad press, the Mac has hung in there. Gradually, it has even begun to appear on the desks of business users. And, Apple has finally stabilized enough to address the Mac's technical problems.

Apple's open Macintosh II is said to have the processor power of a serious business machine and the expansion slots required of an expandable architecture. This Mac is also being touted as open because the user can physically open its case and install hardware.

Additionally, the Mac II is open in a connectivity sense. For instance, one of the operating systems available for the Macintosh II is the A/UX version of Unix from Unisoft Corp. of Berkeley, Calif.

According to Robert Ackerman, Unisoft president and chief executive officer, A/UX supports not only the Transmission Control Protocol/Internet Protocol, but also supports an implementation of Sun Microsystems, Inc.'s Network File System file transfer facility and Apple's own Appletalk networking software.

— Michael Tucker

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Circle Reader Service Number 13

Connectivity

Big Blue Takes Connectivity Vow At 'Yalta West'

Connectivity is becoming the issue on which computers are sold or rejected.

Consider IBM.

At a high-level closed conference last Februrary in Orlando, Fla., IBM's senior executives informed its biggest customers that, henceforth, connectivity will be the order of the day. All IBM future products will be able to communicate with all other IBM products via Big Blue's newly revealed Systems Applications Architecture protocols.

Conference attendees were generally impressed with the Orlando meet. The feeling was that IBM was making a brave statement of direction. On the other hand, they also felt that IBM hadn't any choice but to be brave. IBM is being mauled by such competitors as Digital Equipment Corp. on one issue — the inability of IBM computers to speak to one another.

In a strange way, IBM's problems were the result of its own success. With the introduction of the Personal Computer, IBM had effectively remade the PC industry. The then-standard microprocessor, the Zilog, Inc. Z80 and its relations, and the equally standard operating system, Digital Research, Inc. CP/M, were deposed in a matter of months. The new standard was a machine based on an Intel Corp. microprocessor and the Microsoft Corp. MS-DOS operating system.

An easily copied standard

But IBM soon discovered that while the PC had set the industry standard, it wasn't necessarily IBM's standard. Instead, the PC was an ASCII box that could be easily copied by rival vendors but that could not itself easily communicate with IBM mainframes.

That situation might have been tolerable, except that IBM minis and mainframes couldn't speak to one another either. A System/38, for example, could no more easily communicate with an MVS/XA-based mainframe than it could with a PC or with a product from a rival computer maker.

A number of factors brought about this state of affairs. During the 1960s, for instance, IBM found it useful to maintain multiple product lines and allow free market forces to decide which would become the standard. Later, in the 1970s, IBM was concerned it would be the target of antitrust action and so separated its offerings into incompatible machines that could be spun off into separate businesses in the event of a federally mandated break-up.

But, IBM's biggest connectivity headache may have had more to do with mind-set than marketing or technology. Thoughout IBM's history, distributed processing has simply not been the Big Blue way. IBM had assumed a model of computing in which highly centralized, shared-logic, time-sharing systems were the norm. Users who wished to upgrade their computer power did so by trading in their old centralized system for another, larger centralized system — not by purchasing a second, smaller machine and allowing the two to share work.

Industry observers generally believe that IBM has set out to solve its connectivity problems in the near future. If nothing else, the Orlando conference was proof of IBM's dedication to the idea of connectivity.

But, the same analysts aren't certain that it will be as easy to provide IBM connectivity technology as it is to state IBM connectivity policy. In fact, industry wags have already tagged the Orlando conference "Yalta West," recalling that the real Yalta Conference's brave declarations of international cooperation were followed almost instantly by the Cold War.

— Michael Tucker

Focus also took its picture of corporate America's future to two vendors. Both are involved in connectivity as a business, and so it may not be surprising that they both support the premise to some extent.

Barry Stuttard is the senior vice-president of engineering for Racal-Milgo, a Ft. Lauderdale, Fla.-based maker of communications hardware.

Stuttard said he generally agrees with the connectivity scenario, although with important qualifications.

In particular, Stuttard notes, "We have to define connectivity. It's not just simply the ability to link systems with a wire. The analogy I use is that you can pick up a telephone in this country and call someone in Japan quite easily. But, if you don't speak Japanese, and your listener speaks no English, then you're not going to have a conversation."

With that in mind, Stuttard rejects the notion that MIS of the much-connected future will decline in importance.

Problems in connectivity

"There is a lot more to an MIS manager's job than just letting people get access to mainframe applications. MIS people deal, for instance, with a lot of problems having to do with the security and management of data. One of the consequences of connectivity is that those problems get a lot worse."

Instead, he sees the MIS officer becoming more powerful in, and more important to, the corporation.

Stuttard's MIS director of the future comes close to the CNO concept. "In your scenario, there is no distinction between information and data," he says. "[Data and information] are not the same. The user doesn't want a foot-thick stack of printouts on his desk. He wants on his screen only that information he can use. Somewhere, then, there has to be a filtering process that makes certain each executive gets only what's relative to him."

The people doing that filtering will therefore be hugely powerful because they will control what the corporation sees and hears. "Whoever has that [job] would have an immense responsibility," Stuttard says. "And I'm not sure who in the corporation should have that responsibility."

Very similar words come from Eugene Shklar, director of marketing for PC products at Oracle Corp. Oracle, like many large data base management system makers, is working hard to deal with the connectivity aspects of distributed data bases.

Shklar basically agrees with *Focus*'s connectivity premise, but qualifies MIS's role in that future.

"The water company is a lot more than a legion of plumbers, postindustrial or otherwise. It builds reservoirs and plumbing stations and maintains water purity. In other words, I don't think MIS will become less important. If anything, problems of data security and the like will keep MIS's status as high as it ever was."

Shklar also objects to the idea that local systems, particularly desktop systems, will become relatively unimportant in the new information order. He feels that the PC can function as an interface between the user and mainframe.

"If you look at the amount of work being done in different segments of corporate computing, you'll note that relatively less development is being done in the traditional areas of DP, such as DBMS access and processing, while the vast majority of [development] is being done in interfaces. One of the cheapest and easiest ways of doing that is to move the interface out to the PC, leave the data base on the mainframe and link the two with a wire."

Users rejections and revisions

Focus found a wide variety of opinions among users on its scenario. Some, like Reynold Johnstone, manager of information systems at Alaska Railroad, headquartered in Anchorage, Alaska, come very close to rejecting it entirely. "I think connectivity is a buzzword more than anything else, at least when we talk about desktop connectivity. There aren't that many people who really need it." he says.

He also takes issue with the idea that connectivity will greatly alter the role of the MIS officer. When asked if he thought the MIS officer of the future would manage information more than the mainframe, he says, "I think you're saying the same thing. We already do manage information when we manage the mainframe. I simply don't see the nature of the job changing."

Johnstone does say he feels that connectivity is an important MIS issue, but, he argues, the industry too easily confuses connectivity with micro-to-mainframe links.

"The connectivity issue is one that goes far beyond PCs. If you want to get different systems talking — for example, Wang Laboratories, Inc. and IBM or Digital Equipment Corp. and IBM — that is difficult. The PCs can go in just about any direction you'd care to push them. But getting the big boxes to communicate, that's the far greater challenge."

A more moderate position is best represented by Jim Carrier, manager of professional computing and support technology at Fisher-Price, a toy maker located in East Aurora, N.Y.

"I guess I agree with the scenario in terms of connectivity. I think we'll find that everything has to eventually link to the mainframe. But, that doesn't mean the MIS person is going to be just some kind of high-tech plumber.

"I think that function has to move out to users themselves. They are the ones who are going to have to set standards, establish links and so on. They'll be guided by MIS, of course, but they'll have to do the actual work. MIS is overburdened doing what it already does," he says.

Users Search For CIMple Solutions In Manufacturing

If connectivity seems an important issue for MIS people, consider what it means to manufacturing.

It's generally believed that if the U.S. is to fight Japan's manufacturing power, it must automate its factories. The rallying cry is for computer-integrated manufacturing (CIM).

But, CIM isn't simple. To fully integrate all the machines involved in the business of manufacturing requires that MIS link not only very different hardware and software but also develop different ways of thinking.

How does one, for instance, represent the same set of product specifications so that an engineer can easily access these specs as a three-dimensional graphic on a monitor, so that an industrial robot can access them as a set of assembly instructions and so that a mainframe accounting program can access them as cost-per-unit information? How do you do this when the mainframe, workstation and robot are from different vendors?

Handling that sort of diversity in data isn't easy — as evidenced by the ability of accountants, engineers and factory workers to read the same blueprints in radically different ways. As a result, most vendors have avoided the problem entirely.

Users prod vendors

The Technical and Office Protocol and Manufacturing Automation Protocol efforts are classic examples of users prodding reluctant vendors to provide the connectivity that CIM requires.

But the user that has pushed for CIM the longest may be the federal government. The National Bureau of Standards (NBS) has maintained the Integrated Manufacturing Distributed Database Administration System (IMDAS), a CIM connectivity R&D program, for several years. Users and vendors can become involved with IMDAS. The NBS actively seeks companies interested in becoming research associates.

For more information, write the NBS in Gaithersburg, Md. 20899, or call (301) 975-2000.

— Michael Tucker

Connectivity

Moreover, Carrier says he thinks that if the MIS role does change, it will be less because of connectivity than the realities of departmental computing. Specifically, he sees MIS delegating some of its functions to departmental computing shops.

"I think you'll see development people moving out of the departmental level. The whole process of applications development could be completely decentralized. The only remaining centralized function might be the management of some very large corporate data base," he says.

However, Carrier cautions, there is no technical reason why a centralized or decentralized approach should be superior to the other. Rather, it is an administrative choice based on the decision of chief executives and their staffs. "But even after all this talk about decentralization, it really comes down to a preference on the company's part for one approach or the other," Carrier says.

The most positive user response to *Focus*'s proposed scenario comes from Ken Foghas, the deputy executive director at the U.S. Securities and Exchange Commission in Washington, D.C.

"I think your picture has made some attempt to take into account the fact that information is power and that MIS people will want to keep control of the information pipeline," he explains.

However, Foghas is still critical of the vision. "I also think that the more you attempt to make the PC just a part of the mainframe, the more you try to control the PC from MIS, the more you lose the initiative of the user to go and create things with it. We don't want to get to the point where we're telling you, the end user, how to do your job."

If MIS becomes an end-user advocate and promotes independent local computing power, then, Foghas says, the post-industrial plumbing business is a perfectly acceptable trade. "If, though, you leave the creative control with the user, then I think that's a reasonable way for MIS to go," he adds.

Like Carrier, Foghas sees the future MIS shop controlling a centralized corporate data base. Unlike Carrier, he sees both application development and standards issues staying with MIS. "So long as an application remains restricted to a local user's desk, then standards aren't a problem," he says. "But, when it becomes a companywide application, you have to have centralization."

However, Foghas agrees that much of the processing function will move to desktop systems. "Development and management of data will stay centralized, but analysis will move increasingly to the user."

No one processor will have even the limited independence of a departmental system. In fact, with a few dissenting voices, most of the respondents feel that end users, MIS officers and computers are drowning in data. Users are battered by waves of excessive information and require an MIS department to make certain that only what they need actually appears on their desktops.

Meanwhile, individual processors are submerged in information, not having it piped to them in an easily swallowed stream. The worth of these machines will be judged on their ability to separate relevant material from flotsam. Desktop, departmental and mainframe systems will all coexist with each taking separate and specialized functions and each preserving the independence and creativity of its users.

Maybe the scenario would work a little better if we change the image of data from that of pipes to that of a sea. Future computers won't be like faucets but more like fish swimming through input and applications.

Tomorrow's MIS officers will be more like mariners than plumbers, doing their best to navigate their organizations through the hazards of business.

But, while sea captains may be daring and adventurous, they also run the risk of shipwreck. Miscalculations, system errors, losses of data and total disaster are already part of the lives of MIS officers today. If we accept this second model, then we can forecast that hazards may be part of future MIS officers' lives as well. F

Tucker is Computerworld Focus *features editor.*

> *'[Connectivity's] not just simply the ability to link systems with a wire. The analogy I use is that you can pick up a telephone in this country and call someone in Japan quite easily. But, if you don't speak Japanese, and your listener speaks no English, then you're not going to have a conversation.'*
>
> **— Barry Stuttard Racal-Milgo**

In short, the proposed model of MIS and connectivity in the future fails. It simply does not match the realities perceived by those in the field — users, vendors and analysts alike. While the scenario may come true and prove everyone wrong, the model's rejection by all of the repondents suggests there may be a problem somewhere.

First, the model fails because it suggests that the MIS function will decline in importance. All of the respondents say MIS will retain the same levels of status it has now or even gain ground. Those who feel MIS will gain power believe it will do so by extending its role of information management to the desktops of individual executives — by becoming what Racal-Milgo's Stuttard sees as one who filters information.

Second, the proposed theory predicts that the microcomputer and every individual processor will likewise decline in importance, becoming merely one more node among many in ad hoc multiprocessing networks.

In fact, the respondents' majority opinion is that micros will increase in value by providing an interface between the end user and the mainframe and that the mainframe will keep its role as central repository of companywide data.

Third, the scenario does not predict the delegation of processing to desktop and departmental systems. In the model, local computing may not exist because every processor will be equally available to every application run by every user in the organization.

Perhaps there is an error in how the model treats data. Data is not like water in a pipe, easy to control. The feeling is that end users, MIS officers and computers are drowning in data. Users are

We've Only Just Begun To Link

How long will it *really* be before we have universal connectivity?

Computerworld Focus asked that question to those who participated in our Special Section article on connectivity. Boiled down to essentials, the answer was, "Don't hold your breath."

Representative comments include the following:

- "It ain't gonna be easy." — Ken Foghas, deputy executive director of the Securities and Exchange Commission.
- "Not in my lifetime and probably not in yours." — Barry Stuttard, senior vice-president of engineering at Racal-Milgo.
- "There's still an awful lot to be done, particularly with the International Standards Organization's Open Systems Interconnect." — Reynold Johnstone, manager of information systems for The Alaska Railroad.

What can MIS people do to speed up the coming of that golden age of connectivity?

Our respondents have an answer for that, too. It is, in the words of Racal-Milgo's Stuttard, "Standards. You've got to get a message across that MIS people have to become more involved with the standards issues. If only for their own protection."

— Michael Tucker

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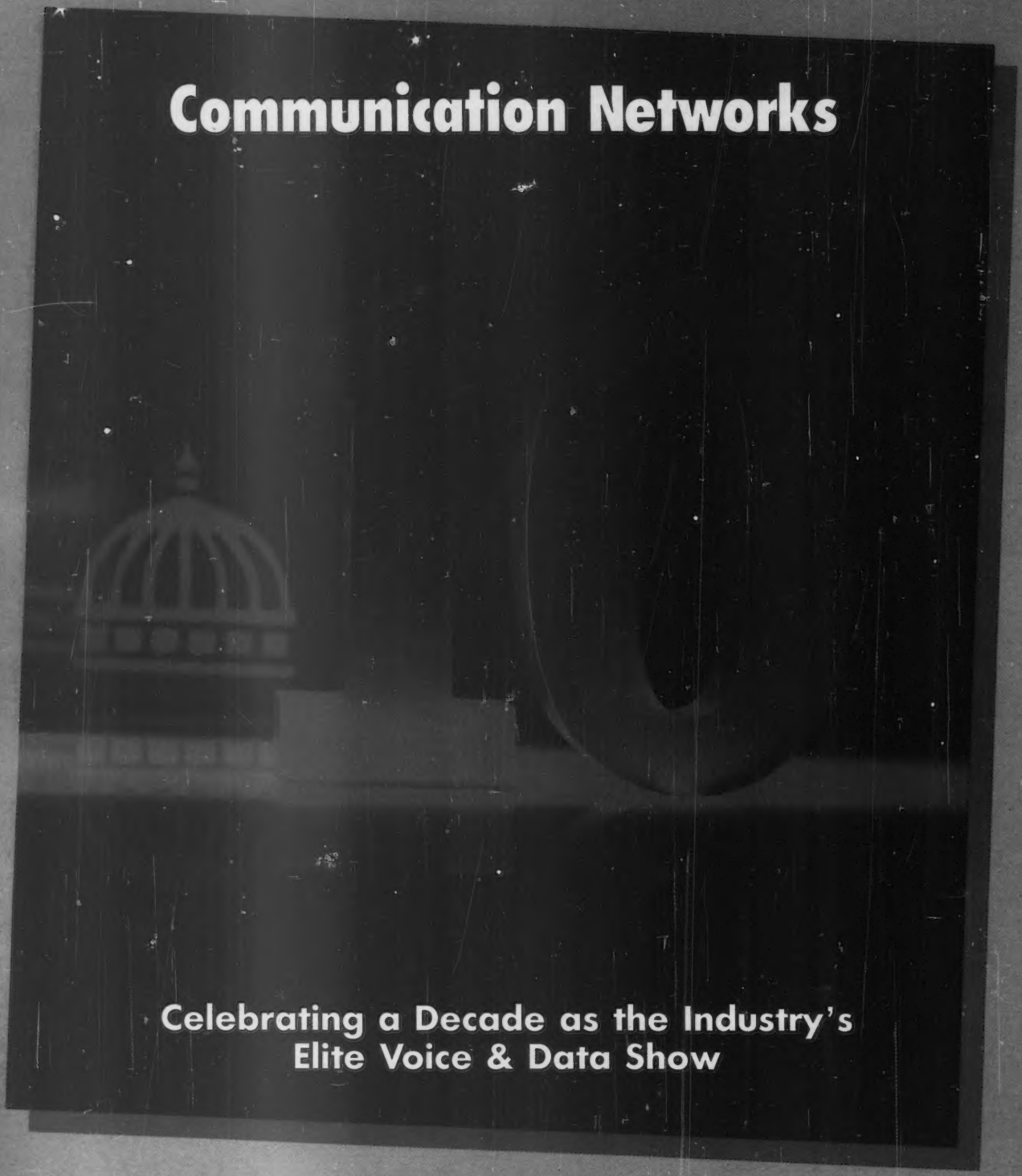

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WIDE-AREA NET STRATEGIES

Users Call On WANs For Far-Reaching Business Needs

BY · EDDY · GOLDBERG

Information is power in today's business arena. A company's ability to move information rapidly from a subsidiary in Kuala Lumpur, Malaysia, to corporate headquarters in New York or just between different buildings in the same city will give that company a competitive edge.

The technological tools to gather information are maturing. Corporations increasingly are turning to wide-area networks (WAN) to tie their geographically separate business and manufacturing units into a coherent electronic information exchange system.

Data from a remote subsidiary can now travel over fiber-optic or dedicated, high-capacity phone lines or even via satellites to and from inexpensive small dishes. On its arrival, the data can be massaged and managed by sophisticated software and data base management systems. Within seconds, it can be transformed into useful information and be rocketed through a company's local-area network, which connects the offices at corporate headquarters.

"Realistically, the technology [for wide-area networks] is here today. We're not waiting on any inventions. You've just got to take a long enough view to make sure that you can make it all fit together," says Tom Y. Rush, national director of Coopers & Lybrand's telecommunications and technical services.

But the advent of new technology is also making the job of the MIS manager even more complex. The increasing rush toward diversification has resulted in more and more locations for a company to link. Merger and acquisition activity means linking data centers that may not only be far away but also may likely have different hardware and software to combine. Finally, U.S. companies' greater reliance on inexpensive overseas manufacturing adds another layer of complication to the job of the MIS manager who must tie remote locations together.

KATHERINE MAHONEY ILLUSTRATION

Despite the many advances in wide-area network technology and the falling costs in a competitive telecommunications market, MIS managers are facing challenges unimaginable only a few years ago.

When considering whether to implement a wide-area network, MIS should examine a company's business and strategic needs if there is to be any hope of success.

Rush says that, while this course of action may seem obvious, many other factors are critical to implementation success (see story page 60). The experiences of two very different companies — Cleveland-based TRW, Inc. and Monaco-based international conglomerate TBG Holdings N.V. — are instructional in showing how following this simple dictum works and how not following it does not.

TBG is an unusual company in how it is structured. In 1985, the company reported $1.8 billion in sales and had approximately 14,000 employees. Its corporate headquarters are located in Monaco; its European headquarters in Amstelveen, The Netherlands, a suburb of Amsterdam; its U.S. headquarters in New York; and a financial center in London. There are about 30 U.S. divisions and approximately 30 in Europe.

WIDE-AREA NET STRATEGIES

"It's got to be one of the strangest [companies] you'd ever want to see in terms of where the people work who are responsible for different things," says Chris Meyer, senior vice-president for finance of information handling services in Englewood, Colo. Meyer was project leader first responsible for putting TBG's wide-area network together.

> *'Unless you have a pretty stable company philosophy, culture, organization, business direction, management, I don't see how you can put in a successful [wide-area network].'*
>
> **— Chris Meyer**
> **TBG Holdings N.V.**

'A real mixed bag'

Adding to the problem of four separate corporate headquarters, TBG also had seven or eight headquarters overseeing various industries within the company at the time that it was planning the network. Each site was different from any of the four corporate centers. "About half the people in the place were reporting to people far away. There were normal corporate functions, but there was a real mixed bag about who was responsible for what where," Meyer recalls.

There also was the knotty problem of transatlantic communication and the complications inherent in bridging the different public data networks across Europe's national borders — not to mention having to unify the different word processing systems and document sizes and formats between the company's U.S. and European operations. Meyer's unenviable task was to set up a network that would tie all of TBG's centers together to exchange word processing, electronic mail and financial information.

TBG settled on a Hewlett-Packard Co. host minicomputer in each location, with the information traveling over an X.25 network. IBM Personal Computers or compatibles connect to the hosts as workstations, and HP Laserprinters are used for output.

But many problems arose during the early planning stages. For starters, the company was reorganized several times, Meyer said, first from a geographic to an industry basis and then into strategic units.

"The corporate pendulum kept swinging from a centralized corporate control function to a decentralized [one]. There wasn't a clear purpose or culture in the organization that would allow one to move forward with any sense of understanding of how to mesh a system with the company," he remembers. He says the reorganizations occurred approximately every six to 12 months, creating a continuing flux in organizational and reporting flows and making his job of network installation all the more difficult.

Midway through the project the corporate executive responsible for designing the system left the company. As the top-ranking finance officer, he had based his plans on the direction in which he saw the company moving and designed the system to accommodate that view. However, Meyer says, the executive's replacement had very different ideas about where the company was headed. The functions in the financial area were changed, and the industry group headquarters reorganized into strategic units located in new and different cities.

Meyer left the wide-area network project midstream via a promotion, and Paul Howes, now director of corporate systems, took over the project. Howes, based in New York, says he came in when the groundwork was laid and the system ordered but not yet installed. He was charged with getting the system up and going. Today, the network has about 135 users, with 70 in New York, 30 in Amstelveen, 20 in Monaco and 15 in London.

According to Howe's account, installing and administering the system apparently has been an easier process than designing and introducing the system throughout TBG. He says the financial reporting is much more efficient, and there haven't been any serious problems.

Transborder data flow problems

One area that Howes still would like to improve is the speed of the transborder data flow, especially for the financial information coming out of Amstelveen. He says that probably the biggest network problem he faces is getting different European government carriers to cooperate in overcoming dissimilar communications standards.

He attributes this planning oversight to innocence abroad. "When we went into this, our primary goal was to get the office automation, electronic mail and financial reporting up and running. We did so with the idea of what the final result was going to be. What we were doing was paying attention to the end result and not the way it was going to get there. We did not, perhaps, pay as much attention to the carriers as we might have."

Howes suggests seeking out word-of-mouth recommendations from users

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THE INFORMATION TECHNOLOGY LEADERS

Henry F. Nanjo
Director Systems and Data Processing
City and County of San Francisco
Age: 58
Budget: $30 million
Cross Country Skier

As the City and County of San Francisco has discovered, there's only one sensible way to evaluate and integrate products into one cohesive information system. And that's with a department strongly guided by an experienced, innovative information services professional like Henry Nanjo.

Henry didn't always have a multi-million dollar budget, with responsibility for the acquisition of hundreds of micros every year. In fact, when he started working with San Francisco's computers 31 years ago, Henry didn't even have a DP department. He simply worked in accounting with his state-of-the-art IBM 305.

Over the years, many of the applications Henry developed have helped keep San Francisco among the country's most innovative users of computer technology.

San Francisco made headlines recently with the first computerized fingerprint matching system. With it, prints can now be matched in less than 3 minutes—a far cry from the 4 weeks required to do the job by hand. Already, the system is credited with helping solve some 40 major unsolved crimes.

Today, Henry is in the process of evaluating both existing and potential vendors of minis and micros—and maintaining an approval list of vendors for purchases made throughout the organization. Every computer-related expenditure, whether it falls within Henry's $30 million budget or the City and County's $60 million budget, must bear the name of a vendor appearing on Henry's approval list.

What little spare time Henry finds, he spends with his sons camping, hiking and cross country skiing in areas like Tahoe, Yosemite Park and the Shasta Mountains.

If you'd really like to reach Henry, you'll find him on Monday mornings with his copy of Computerworld—he's been a subscriber since the first issue. He finds Computerworld's perspective meshes closely with the way he does business, covering everything from mainframes to micros, software and state-of-the-art technologies.

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Big Eight Firm Divulges Tips For Networking

Before deploying complicated and expensive wide-area networking technology, consultants at Coopers & Lybrand recommend that corporate officers ask some very basic questions such as: How is this capability going to help the corporation? Will there be better inventory control? Shorter lead times? Better customer contact? Increased profits?

Before plunging ahead, be certain that a wide-area network will result in increased corporate profitability. Other key factors Coopers & Lybrand analysts stress for successfully implementing a wide-area network include the following:

- Select a single project manager, someone who understands both the business and the technology.
- Weigh carefully whether to independently implement a wide-area net or to use a service from a telecommunications carrier.
- Choose the technology most appropriate for your business rather than going after leading-edge solutions.
- Involve the users whose job functions a wide-area network will affect.
- Introduce the technology in steps, perhaps to small groups first and then to those that are likely to embrace it and spread the word to others.
- Think in terms of two MIS budgets, one to maintain the status quo and another to handle the strategic investments a wide-area network represents.
- Factor in the frequently forgotten costs of employee training; increased operations staff; managing and administering the network; and facility costs such as floor space, electric power, air conditioning and so on.
- Plan for excess capacity to account for the "turnpike effect" — the fact that traffic always increases when a new highway is installed.

— Eddy Goldberg

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more experienced in the area of international data communications before choosing a vendor and a carrier for such a wide-area network. He says to ignore hype and to "even elicit a promise from them, or some kind of indication of what to expect in the way of rates and effective speed."

When the network was still being set up, Meyer did a bit of political trailblazing, refereeing turf wars without the full authority to resolve them. "Before the system came in, because the company was so scattered around, you got this thing of power through control of information. What we were trying to do with this system was decentralize the information process and processing to where the financial responsibility was [and] then bring it together in a consistent format shortly thereafter," Meyer says.

"I think that the old theories that the way to preserve power is through control over information were hard to extinguish," he explains. This information control factor made it difficult for Meyer to get people to cooperate in the use of the system. "Just to get the spirit of cooperation going in this decentralized environment was real tough. Unless you have that spirit of cooperation, you're not going to be able to fine-tune the system to the point where the system is doing the things that you really wanted it to do, that the company needs it to do."

Meyer says the people responsible for the different levels of financial reporting did not like the system because it stripped away their old ways of doing things. And, because the users were not first unified under a workable corporate culture, it was more difficult to get the system together.

In the early stages of implementing the wide-area network, Meyer encountered difficulties. "I don't think the groundwork was set organizationally and people-wise," he says. "The people first have to be working together, and then you bring in a system. They have to have input in the design of the thing, and they have to have a lot of input as to the way they're going to work with it." Unfortunately, this necessary user support was not present at TBG for a number of reasons.

One reason was the lack of sufficient personnel to design and implement the wide-area net. Meyer had to get the job done with only one person assisting him. "One or two people in systems development can't sort out the organizational problems in the company when they come into conflict with the possibilities of developing a good system," he says.

"There were just so many conflicting views by very powerful people in the company as to the way this should work. It was laid on the systems development people to develop something that could be all things to all people. And that's a real impossibility," he explains.

Meyer says the system works very well from a technological point of view, and Howes says no major gaffes were made during installation. Still, Meyer thinks the system could be better utilized if there was a more coherent company culture and a greater spirit of unity.

"Unless you have a pretty stable company philosophy, culture, organization, business direction, management, I don't see how you can put in a successful system of this nature . . . in a useful sense to the company." While the system is functional, cost-effective and does what it was

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WIDE-AREA NET STRATEGIES

designed to do, there is great room for improvement in terms of how it ties in with levels of reporting responsibility, people's jobs and on which side of the Atlantic the corporation's focal point is going to be placed.

Looking back, Meyer suggests some basics for those about to become involved in planning, designing or implementing a wide-area network:

- Have an overall vision and strategy as well as a person with sufficient authority to resolve conflicts as the project leader. Once TBG decided to go ahead with the system, it was up to Meyer to work with the power brokers to design it and reconcile conflicting views.
- Don't try to do everything at once. Prioritize everything and work through one stage at a time. Go for success with one function and people's relationship to that function. Feed off that success for the next step. This generates the possibility of setting up a consensus.
- Don't even attempt to put in a wide-area network unless the company has a well-defined direction, philosophy and culture. The organization of the firm and the staff needs to be cohesive and efficient beforehand; the system will not magically provide these attributes. Play around with an ad hoc system for a time, and address organizational problems first.
- Allot sufficient time and personnel to the networking effort. Under TBG's plan, there was not enough time to involve the users in an effective way because there were only two people to set up the network.

While TBG had to overcome difficulties caused by organizational changes, it eventually produced a successful system. Another company, TRW, is currently implementing a wide-area network with a methodical approach designed to head off potential problems.

TRW, a $6 billion diversified corporation with approximately 93,000 employees, is now in the process of replacing its voice network and creating a large IBM Systems Network Architecture (SNA) network as well. The two networks are in the midst of being combined into a cost-effective, modern customer-control type of environment, according to Kenneth Jankowski, manager of network services.

Ultimately, when T1 links and T1 multiplexers are installed, the result will be a domestic coast-to-coast SNA network with the capacity to support voice, data, text and images.

The first step will be to build a data-only network. An IBM 3725 and two IBM 3720 controllers will be set up in a triangle at three strategic sites across the U.S. The three nodes will be connected by two 56K bit/sec. links on each leg of the triangle to ensure communications in case of problems.

Look at the people side

Jankowski says the human aspect, or "people side," of introducing the network — in terms of the behavioral changes the technology will bring to the users and the challenges to MIS's abilities — is possibly more interesting than the course of the technology.

TRW's telecommunications strategy and corporate plan hinges on economies of scale and resource sharing. In the company's decentralized culture, there is a strong commitment to local business units making their own decisions.

> *The secret of [wide-area network] success involves gaining sponsorship — the political and business support that translates into funding.*
>
> **— Kenneth Jankowski**
> **TRW, Inc.**

The first step in the combined networks planning process was to take a corporatewide survey that looked in two different directions. "We looked backward to see what are the shortcomings and weaknesses of the telecommunications functions and services available within TRW today," according to Jankowski.

The survey examined operational weaknesses, such as the inability to move information between disparate machines, not recognizing the economies of scale to be gained from staying with one or two vendors and administrative problems of managing change control and end-user education.

The next step was to look forward to the strategic technologies emerging in the marketplace in the next couple of years, such as expert systems, fiber optics and very small aperture terminal networks. Some of the technologies may solve current problems, Jankowski says, while others will position the company competitively in the coming years.

Business case study

After assessing the options, Jankowski examined the steps necessary to take the firm's existing technology base up to the next level of functionality and cost performance. The results were documented in a study communicated to all levels of MIS management and to team managers throughout the company via face-to-face visits. "It's a business case study, not a technology study, that translates technological capabilities into bottom-line benefits for the nontechnical person," he says.

"In our environment at TRW just a simple plan is a six-month to a one-year process," he says. Though the process can be viewed as slow, Jankowski says it is well worth the effort and time. "If you don't get support from the constituency you're trying to serve, you're doomed to fail. So, we go to great lengths to communicate and to gain that [support]."

Jankowski says the secret of success, whether for a huge decentralized corporation like TRW or for a small, centralized company, involves gaining sponsorship — the political and business support that translates into funding. That support is achieved by communicating the system's value to the key decision makers in the company.

Within his own network services department, Jankowski says he "demands and expects from our professional analysts the ability to meld a thorough understanding of complex technology . . . with the skills of an MBA graduate — somebody who understands how the application of technology is in the end supposed to translate into benefits for the bottom line of the corporation and value for the shareholders of TRW." He is quick to acknowledge this is a very polarized and hard skill set to find.

For Jankowski and his employees, the challenge is not in understanding the technology or where to get it but in "trying to innovate and create productive applications that use and rely on the technology." He also stresses a basic tenet for his department: "All telecommunications people are in the customer service/customer satisfaction business," he claims.

Jankowski emphasizes three critical steps in making a wide-area network plan a reality:

- Establishing bulletproof partnerships with key vendors so they also have a stake in the success of the system.
- Talking up the benefits the new system can bring.
- Delivering what was promised in the planning phase. This is why good initial planning is so important.

There are also some definite things *not* to do when planning and installing a wide-area network. Jankowski refers to these as "land mines." Some potential land mines include the following:

- Underestimating the capabilities and intelligence of end users.
- Believing that technology drives business, at least in an office/business/management environment.
- Assuming that because the company has good people, the staff will learn on the job as the technology rolls out. Users need to understand the context of their newly automated actions and be thoroughly trained in the use of the wide-area network.
- Not giving the networking staff feedback. Jankowski stresses that people need to observe self-progress and know where they are going. Career paths need to exist within the organization in order to retain key skilled personnel.
- Thinking you've identified all the land mines. "The real bad ones you can't see," he warns.

Company dynamics and politics vary widely from one organization to the next, as illustrated in the cases of TBG and TRW. Some matters clearly are beyond MIS's control. A wide-area network implementation demands sensitive political and management skills from MIS because connecting separate locations often results in the loss of power, control and authority by local or regional managers — despite the gains in overall corporate communications, cost-savings and efficiency.

MIS managers should keep alert to the fact that they are frequently caught in the middle between the corporation's overview and local and regional management's concerns regarding the process of wide-area network implementation.

Goldberg is a free-lance writer based in Framingham, Mass.

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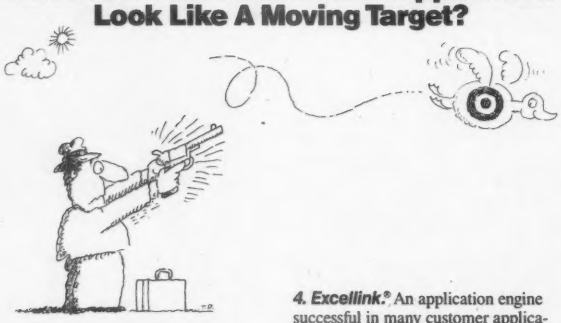

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Beyond The Stand-Alone PC

BY · VERNON · W. · YATES

The industry's attempts to acclimate personal computers in the corporate environment have met with limited success. MIS has turned the PC into a multiuser system, taught it to work in local-area networks (LAN) and forced it to emulate a variety of terminals. But no matter what guise it has worn, the personal computer has remained first and foremost an independent, single-user machine.

That stand-alone quality has been responsible for a great deal of the PC's appeal. However, when PCs need to be used collaboratively as components within organizationwide processing systems, the fit isn't exactly right.

PCs are an expensive solution in a large-scale network. Often, not all the PC's features are needed in such an environment.

And because of the PC's independent nature, it is frequently difficult for MIS to control software use. Further, the issue of data security is a concern because each PC has the ability to download data onto floppy disks.

Intelligent terminals are logical alternatives for many applications, but they, too, have limitations.

For example, very few terminals have flexible local processing capabilities and their memory can be a restraint when downloading large data base files. Terminals also tie up mainframe processing power and cannot run PC applications software.

PHOTO BY GEOFF O'CONNELL

In recent months, however, a new breed of intelligent workstation has evolved. These machines function much like PCs but are a departure from the idea of the self-contained computer system. These workstations are meant to be used within an overall processing system, not as individual computers. They are significant in that they have the potential to greatly expand the application of PC products in communications-oriented environments.

Like personal computers, PC-based workstations are built around a microprocessor such as the Intel Corp. 8088, 80286 or 80386 and can run industry-standard PC software. These machines also come with standard random-access memory and a choice of monitors and keyboards.

PC-based workstations are different from traditional PCs in storage, size and expandability. Some workstations come with fixed or floppy drives, but they can also be diskless, having no local storage capacity. PC-based workstations are also lighter and exceptionally smaller than desktop PCs.

This smaller size can be attributed to fewer expansion slots and a limited number of disk drive positions. While eight slots seem to be the standard for PCs, most PC-based workstations have either none or only one slot available, usually for a communications board. The use of only one 3½-in. disk drive, a smaller power supply, very large-scale integration and surface-mount technologies have also contributed to the machine's small size.

At first, PC-based workstations might appear to lack some of the attributes that have helped make personal computers so successful: expandability

and options for varied configurations. Yet, companies are finding that many of the features the firms have paid for, like expansion slots and drive positions, are not used. Frequently a slot for a network or host communications board, a hard disk or a floppy drive are sufficient for the majority of a company's users. With the increasing use of LANs and file servers, sometimes even the disk drives are dispensable.

Some label these PC workstations as "scaled-down PCs" — a misleading phrase. True, these machines perform functionally as PCs, but they should not be compared to PCs as stand-alone machines.

PC-based workstations are not designed for strict, standalone, self-contained use; they are meant to work in situations in which expandability is limited and communications is paramount.

PC-based workstations offer not only a scaled-down size but also a scaled-down price. Typically, a 286 PC-based workstation configured with a hard disk will be half the price of a similar IBM Personal Computer AT-level machine.

Volume discounts may even pull the price to less than $2,000, giving 286-performance at a price comparable with the current 8088-based PCs. Potential savings can be as much as $2,000 per unit. For large organizations, the price impact can be astounding.

A hybrid machine

Some industry observers have called PC-based workstations hybrids between PCs and terminals, and to some extent, that is correct. Certainly, however, they are much more than intelligent terminals.

Most important, PC-based workstations provide useful and general-purpose local processing capabilities and have, or can have, local storage. That means a user can download data base files or other information from a mainframe or departmental computer, store it on a disk and disconnect his PC from the host. Or a user can hot key between local storage and the host to move information back and forth.

In contrast, intelligent terminals, because they cannot process data as effectively, must remain on-line, consuming expensive mainframe MIPS (millions of instructions per second) and using host and communications resources that can be utilized more efficiently.

Another advantage of PC workstations over terminals is PC processing power. Not only can these workstations run thousands of PC software packages, but they can also streamline the manipulation of data from mainframe applications. Information systems are increasingly being designed around a PC architecture, and many mainframe applications are providing direct links between PC software and the host.

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As in the comparison with PCs, cost becomes a factor in looking at PC-based workstations and terminals from price/performance perspective. The slimmed-down price of PC workstations closes the gap between the cost of a terminal and the cost of PC processing. It is usually enough to justify the small premium for a workstation because users get the power of a 286-based PC, a very attractive benefit.

Beyond cost benefits, the PC workstation even brings operational advantages over the PC in terms of data security.

Configured without a disk drive or with only a hard disk, PC workstations give MIS control of its company's data because users cannot download information and remove it on a floppy. The data would reside in a central storage location, either

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The corporate guise

But where do PC workstations fit into the corporate environment? Because they are expandable, general-purpose computers, PCs can conform to a variety of situations. Users can call on PC-based workstations when the work environment is stable, well-defined and less likely to change. In this case, the user will typically be performing a well-defined set of tasks.

A claims processing station in an insurance agency would be an appropriate situation in which to use a PC workstation. Here the user might only see five different screens and access the data base to do 90% of his job. The remaining 10% might entail some spreadsheet work and electronic mail.

PC workstations are also designed for environments requiring interactive communications. They can be practical upgrades for most of the 8088 PCs now used for heavy communications tasks.

In addition, PC workstations can replace many IBM 3270 terminals. A recent International Data Corp. study predicted PCs with emulation boards would usurp 43% of the 3270 terminal market by 1990; as cost-efficient alternatives to PCs, PC workstations stand to command a good part of that shift.

New York brokerage house E. F. Hutton & Co. is a company that opted for a PC workstation system. Actually, for some time, E. F. Hutton restricted the use of PCs in its offices altogether, instead providing its users with terminals running off minis.

But the company needed a more practical solution for its brokers. Because desk and office space were at a premium and the company did not want brokers' desks cluttered by computer hardware, size and display played an important part in the choice of system. The company also wanted a system with high-resolution graphics to color-code great amounts of on-screen information in a highly legible form.

E. F. Hutton finally found its solution in a PC-based workstation system it put together called the Advanced Workstation for the Executive (AWE). AWE uses a PC-based workstation as a front end to access on-line data on the stock, bond, options, commodities and mutual funds markets, a range of analysis and office automation applications and several other functions the company developed in-house. PC applications can be used as a sideline to these.

Other organizations join in

E. F. Hutton is by no means the only firm exploring the benefits of PC workstations. A major oil company has begun building PC workstation LANs with AT compatibles acting as servers and gateways to mainframes.

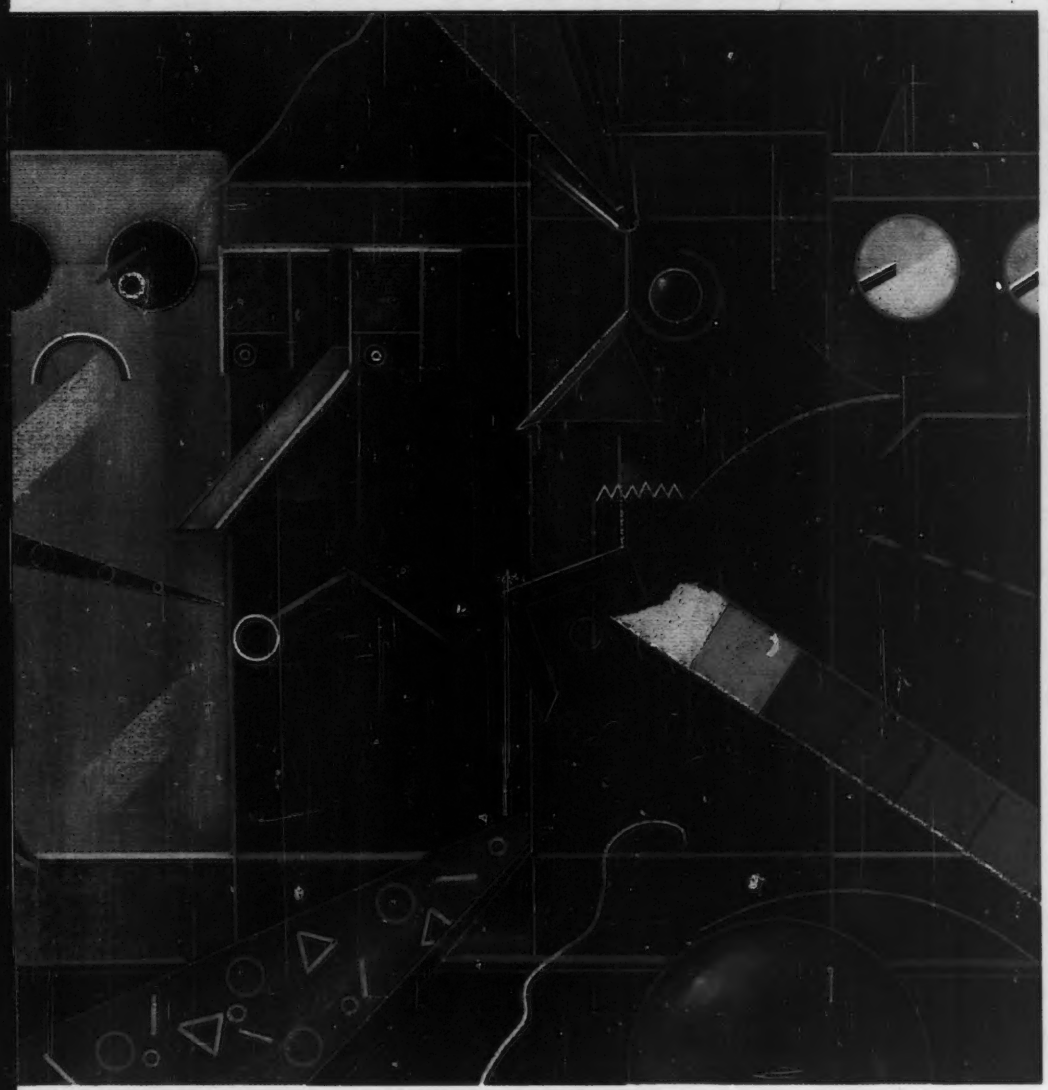
Furthermore, one of the nation's leading retailers is looking at a system in which PC workstations serve as catalog terminals at which customers can review and order products.

And a large bank in the South has configured PC workstations with communications boards for an IBM Systems Network Architecture connection. The workstations then communicate with the bank's hosts through a series of cluster controllers.

PC-based workstations are broadening the field of applications for PC-related products. With their price and performance advantages, PC workstations should begin encroaching on markets in which terminals once held sway, bringing PC technology to a new realm of uses.

However, PC-based workstations will not supplant the PC. There will continue to be users who need and use the expandability of a full-size PC. The success of vendors of high-speed drives, accelerator boards, keyboard enhancers, desktop organizers and the like can attest to the PC's stability. However, the new breed of PC workstations will take its place in the corporate computing environment. F

Yates is vice-president and general manager of NCR Corp.'s Dayton, Ohio-based Personal Computer Division, which markets NCR's PC products through a network of more than 800 retailers and value-added resellers. He has served in that position since 1984.



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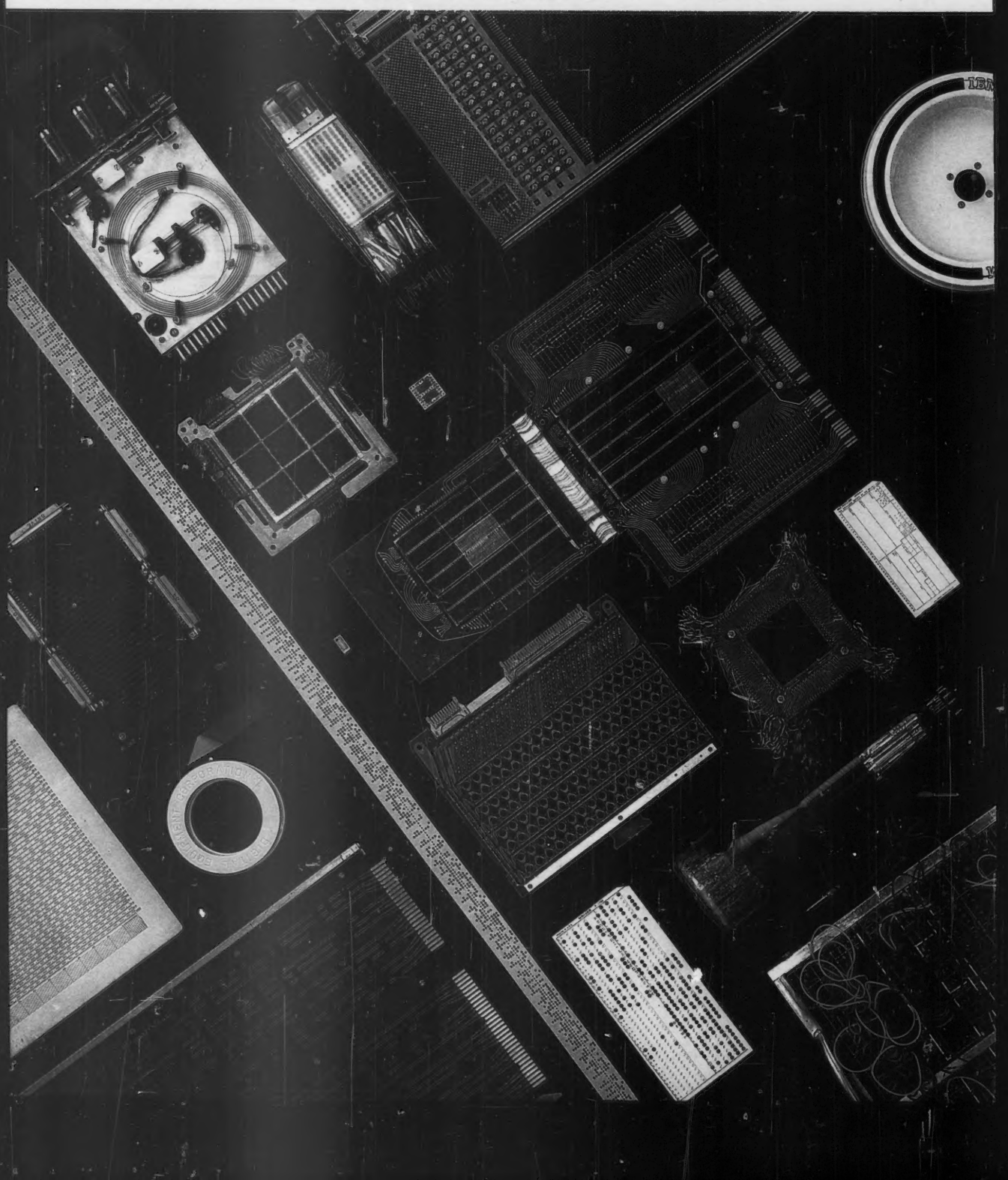
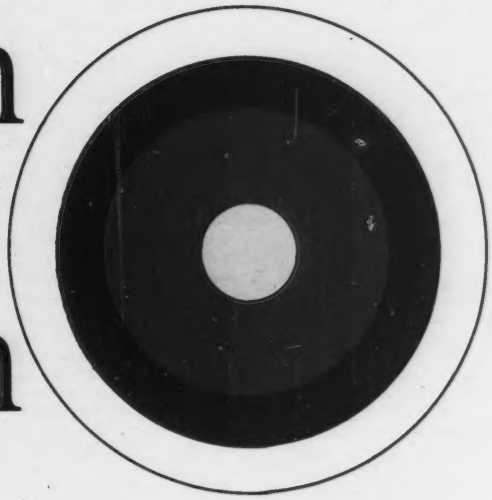


NETWORK SELECTION

Don't Miss The Mark In Network Selection



BY · GIG · GRAHAM & · TOM · SCOTT

MIS managers must satisfy two objectives when implementing local-area networks: They must allow individuals and work groups to share expensive computer resources, and they must enable people and applications working on different machines to communicate. The crux of the matter for MIS is to find the right tool for this complicated task.

To accomplish this objective, MIS should start by identifying the specific computing requirements of its end users and the appropriate machines that will fill the needs of these users.

For example, network strategies for scientific computing are very different from those for corporate information centers. To make MIS's problems even more challenging, computers used in each market often range from IBM Personal Computers to Digital Equipment Corp. VAXs to Cray Research, Inc. supercomputers.

This article will review several network communications strategies and propose a new way of evaluating product solutions. It will also examine network strategies from the perspectives of the driving application forces in the market that require network systems to operate effectively and from the available solutions that can sustain those forces.

These forces and solutions can be analyzed by contrasting network applications using the following criteria:

- Are the processing requirements of applications insensitive to time and responsiveness (batch), or are they extremely time and response sensitive (interactive)?
- Do the applications communicate with and depend upon roughly equivalent processing resources in the network (peer to peer), or do they require the intervention of a host machine (hierarchical)?

MIS managers must scrutinize the trade-offs they make when selecting applications that their market segment demands, the network system services required by the applications and the appropriate cabling systems needed to support the applications and network system services.

The hierarchical network topology is best characterized by the traditional IBM Systems Network Architecture (SNA) approach in which all requests for services by applications and users are routed through mainframes. Another example of a hierarchical network is the telephone system. Depending on the level within an organized hierarchy, users can communicate

NETWORK SELECTION

by prefixing a session, or telephone conversation, with packet headers, or telephone numbers, as follows:

- 1-4. Interoffice (via a small switch in a private branch exchange).
- 7. Within a local area (via a medium-size switch).
- 8. Within a small state (via a large switch).
- 11. Within the U.S. (via many switches).
- 13. Within the world (via a lot of switches).
- 16. Within the universe (to be announced).

The hierarchical topology requires the user and application to know how to navigate through the system; it is not seamless or automatic.

Hierarchical's good points

The hierarchical model works well in simplifying the organization of complex networks, responding to time-critical applications, guaranteeing a predictable response to requests for services, providing volume throughput in a computing center and maintaining information and resource security.

A second network topology, peer to peer, is like a conference room with a round table; users and applications can communicate directly without having to expressly involve resources and services from another computing center.

In a peer-to-peer topology, approximate equivalency is maintained even when peers change places, which is not the case in a computer/terminal hierarchy.

Scope must be limited

One aspect of a peer-to-peer network is that the scope of the network must be limited, otherwise, intermachine communications becomes unmanageable for MIS.

While peer-to-peer communications is currently immature, this technology is the objective of many hardware and software vendors.

The peer-to-peer topology is recommended for applications in which there are a significant amount of interactive conversations, as in departmental computing, and for seamless connectivity of applications and data on many machines used by individuals who do not have the time or inclination to learn to navigate through computer networks.

The processing characteristics of applications are key to individual network strategies, with batch processing associated with insensitivity to time and responsiveness and interactive processing tied to sensitivity and responsiveness.

Where is the expense?

Another way of considering the batch/interactive paradigm is whether companies should invest more effort in managing the use of the computer or in improving the productivity of the individual user. MIS managers need to decide which is more expensive: time or the computer interface.

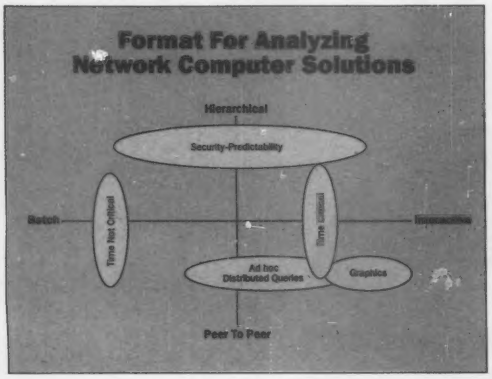
For example, in process control, a plant manager lets the computer sit idle in order to be ready to respond to random activities of the plant. Yet in an IBM MVS/XA DP environment, user applications are scheduled to optimize the use of the computer center.

Electronic mail and distributed data base management systems (DBMS) are other examples of the batch/interactive paradigm.

E-mail is a single application that may access many different computer sites. A user would not want the mail program to access each site before returning control of the computer. Instead, the E-mail application should be handled in batch mode.

On the other hand, applications accessing distributed data bases, such as real-time graphics monitoring devices, depend on the timeliness of the transaction.

Even though a data base query may access many different sites, the graphics monitoring program depends on the responsiveness of the DBMS.



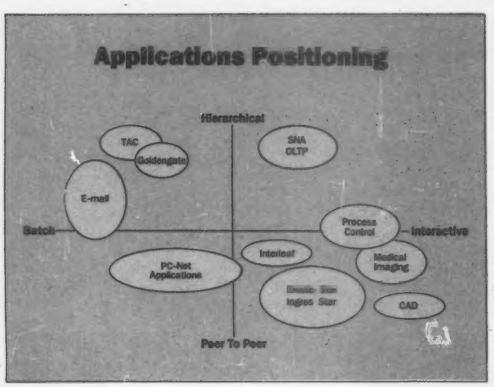


Figure 2

Figure 1 illustrates a framework that MIS can use to compare characteristics of network computing and shows the method that can be used to evaluate applications, system services and cabling.

The top ellipse indicates that whether batch or interactive, hierarchical computing is particularly suited to applications that are performance sensitive, requiring the most powerful available computing resources; are security sensitive; or require high predictability (such as radar-based airline collision detection systems).

In the lower ellipses, which is the domain of workstation and desktop computers, applications are memory intensive, such as spreadsheets and full-screen document processing programs, or graphics intensive, such as three-dimensional modeling and other computer-aided design (CAD) applications. The batch/interactive axis indicates the importance of responsiveness to applications.

Applications fall into different areas on the axis. Figure 2 illustrates the position of different types of applications.

Positioned in the batch/hierarchical quadrant, The Application Connection (TAC) from Lotus Development Corp. is a virtual terminal (a local personal computer that functions as a mainframe terminal) and a file transfer program, which allows a spreadsheet user to upload/download data to and from mainframe data bases.

Because the PC is single tasking, there is little synchronization of separate applications on the local node and remote host. Goldengate from Cullinet Software, Inc. also falls into the hierarchical/batch area.

E-mail provides different functionality than TAC but operates in a similar way. Also a file transfer program, E-mail routes mail packets through the computers located between the sender and receiver of the mail. Unlike TAC, the E-mail packets are processed when the intermediate computers are ready, not when the packet arrives at an intermediate location.

Products in the interactive/peer-to-peer quadrant include distributed data base managers such as Oracle Corp.'s Oracle Star and Relational Technology, Inc.'s Ingres Star, which service requests without requiring the user to specify the location and the route to access the information.

Other interactive/peer-to-peer applications that provide different functionality but have similar operating features are solids modeling and image processing.

These applications involve pictures, based on large data management systems, that are transmitted among remote graphics workstations. When parts of an image are manipulated by one user, other users must be able to view the changes quickly and easily. CAD applications are also in this area.

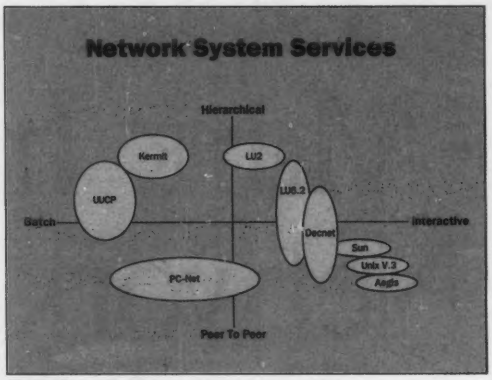


Figure 3

There are many applications between these extremes.

Figure 3 illustrates sample network services required by the applications in Figure 2. Kermit is a file transfer service that manages transmission of small packets of data over low-speed communication links. It performs error checking and retransmission and can transmit ASCII and binary data.

The Unix utility Unix-to-Unix-Copy (UUCP) is widely used to support E-mail among a network of more than 10,000 computers. UUCP accepts a mail message initiated by a user and works out the dialing, routing, transmission and transliteration processes to send mail to the recipient.

OLTP applications

LU2.0 is an early IBM SNA facility developed to support, among other things, on-line transaction processing (OLTP) applications for the airline and retail industries. While still fundamentally hierarchical, OLTP applications are much more interactive than either E-mail applications or their IBM MVS batch counterparts and, correspondingly, require better interactive services.

The advent of desktop computing has fragmented processing power. Desktop computing also challenges vendors to develop system services that can unify access to installed computing power and synchronize

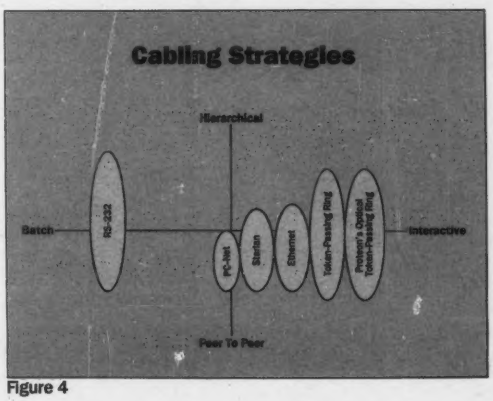


Figure 4

use of the facilities throughout a network.

IBM PC-Net shows a primitive set of services available for loosely coupling microcomputers. While there is no sharing of processing power in PC-Net, different personal computers can share a disk and, thereby, have access to reasonably timely changes in the data serving different applications.

Sun an early leader in peer to peer

As applications depend on more extensive process synchronization among machines, more powerful network system services are required. Sun Microsystems, Inc. was an early leader in developing peer-to-peer communications systems based on Ethernet. However, its key synchronization facilities were immature.

In contrast, Apollo Computer, Inc., through the company's proprietary Aegis operating and network communications system, achieves a high degree of process synchronization within an Apollo network.

AT&T Unix System V Release 3 provides an open architecture for network communications, combining the better networking services from Apollo and Sun with many important, new services.

IBM, with LU6.2, is developing services equivalent to Apollo, Sun and AT&T and will be able to support a new generation of distributed, connectable applications.

Interactivity and high-level networking services are only as efficient as the speed of the network cable. Because a network is a form of a bus, it is useful to consider the history of industry standard buses to forecast how cabling systems may evolve.

DEC's Q-bus was widely used during the heyday of the company's PDP-11. It was open, simple and widely accepted as a standard for peripherals. But as applications became larger and more memory intensive, the Q-bus's relatively modest bandwidth became a bottleneck. Today, DEC's VAXBI bus is four to 20 times faster than Q-bus and supports a generation of applications that could never have been developed for the Q-bus.

Cabling systems are facing similar pressures today. Figure 4 plots the network cabling strategies necessary to support network system services and applications.

For example, image processing applications are unthinkable over 9.6K bit/sec. RS-232 lines and challenging over heavily loaded Ethernet facilities. But with Proteon, Inc.'s 80M bit/sec., token-ring, fiber-optic cabling system, a world of applications becomes feasible.

Image processing at UConn

Image processing at the University of Connecticut Health Center's Department of Radiology is a good example of new applications.

The school's picture archiving and communications system routinely transmits digital images that are each represented by 4M bytes of data. A routine day involves the transmission of several hundred megabytes.

In many ways, Proteon's ring wiring system makes possible an application that otherwise was only possible through use of pictures sent by courier from one office to another.

Interactive communications is not better than batch, nor is peer-to-peer better than hierarchical. If a local application needs only small amounts of data from a host, hierarchical RS-232 links may be perfectly acceptable.

> *As applications became larger and more memory intensive, the Q-bus's modest bandwidth became a bottleneck. Today, DEC's VAXBI bus is four to 20 times faster than the Q-bus.*

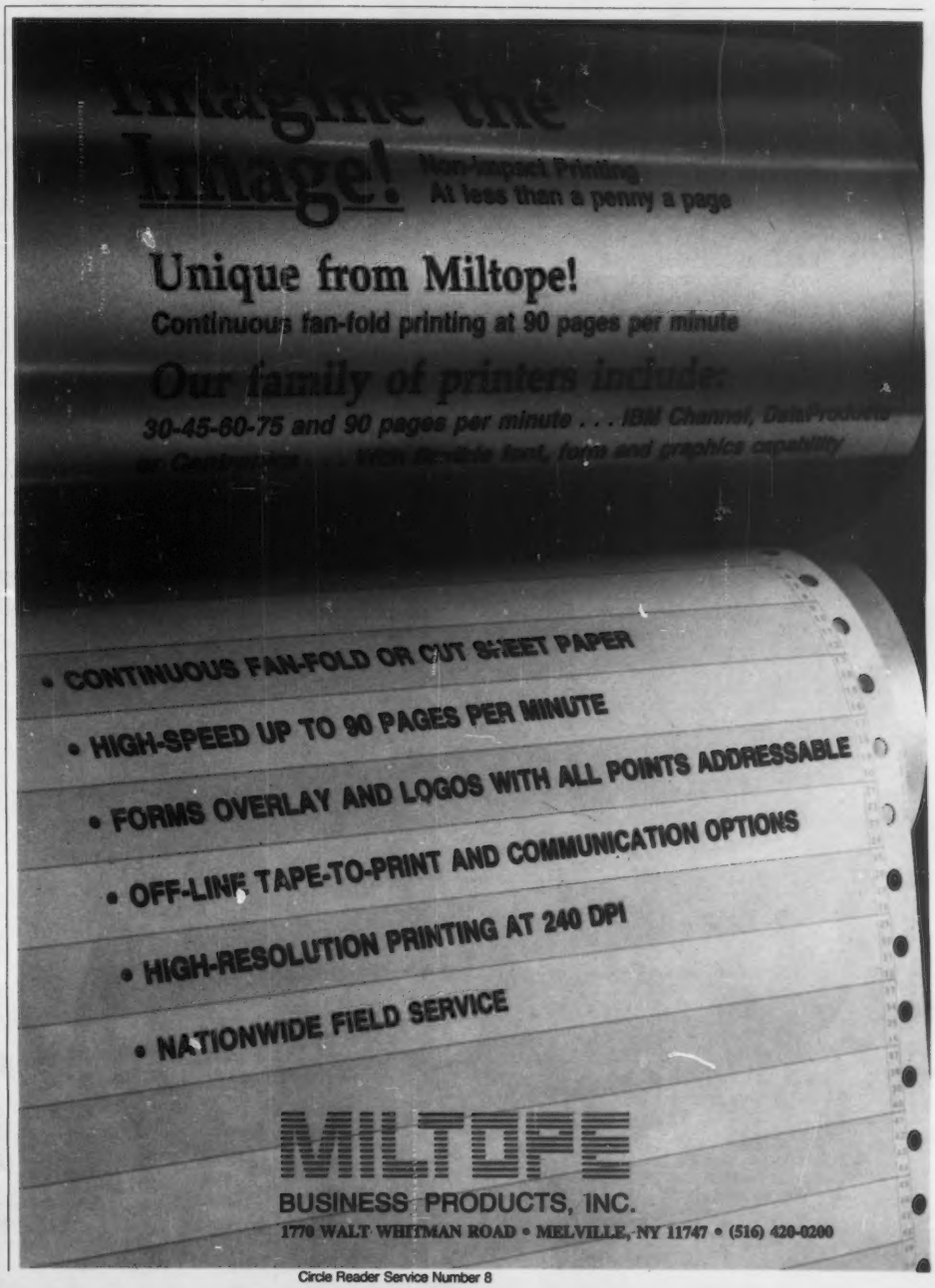
If a manufacturing control operation requires a host mainframe to perform linear programming applications to control resource refining, MIS may find a hierarchical topology, intermediate network systems and 10M bit/sec. cable to be appropriate.

If you are considering an interactive imaging application in which segments of an image manipulated by one user are viewed by all others, state-of-the-art system services and high-speed cabling will be essential.

The basic message for MIS is to plan an applications strategy, then select network services and cabling systems based on how wel' they fit in with a company's objectives. F

Graham is a graduate of MIT, cofounder of a Washington, D.C.-based consulting firm, Industrial Energy Users Forum, and a software company, Venturcom, Inc. and is currently a member of the Gartner Group, Inc.'s Software Management Strategies team in Stamford, Conn.

Scott is an MIT physicist, developer of advanced network communications software services and has written several articles on network strategies. He is currently director of operating systems for Venturcom in Cambridge, Mass.



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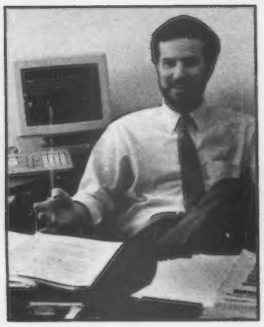

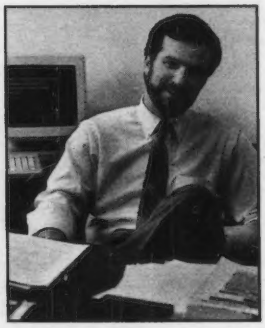

Falco Data Products likes to describe its new Falco 500 high-performance video display terminal as *"spectacular."* And, in late 1985, when Falco wanted to tell MIS/DP directors — who buy terminals in quantity for their companies — about this *"spectacular"* device and its distribution through national sales channels, the company chose Computerworld — along with some other MIS/DP publications.

But, says Director of Marketing Tom Sullivan, when sales leads started coming, the number of leads generated by Computerworld was twice the number generated by the other books. *"That's pretty spectacular in itself,"* Tom says. *"We were also using the other well-known MIS/DP publication and a host of other books. When you consider the fact that Computerworld outdrew them all by a 2-1 margin, I think the only word for it is "spectacular."*

And those leads are still coming in. *"We're continuing to receive a steady flow of responses,"* Tom confirms. *"Front or back, left or right; no matter where our ad appears, it pulls very well."*

Shortly after seeing the success of Computerworld ads, Falco dropped the other major publication from its list. *"Our leads and feedback from the field told us that Computerworld is better. Besides,"* he adds, *"how can you argue with a 2-1 margin?"*

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VSAT UPDATE

VSATs Help Conquer Leased-Line Woes

BY · RONALD · BOSCO
& · PHILIP · FREEDENBERG

Timely access to accurate information is vital in business. One of the principal weapons in U.S. business's arsenal is the availability of a vast array of communications tools and services. One tool, very small aperture terminals (VSAT), can help solve some of the most difficult transaction networking problems as well as improve a company's strategic outlook and bottom line.

Since early 1970, the cost of computer hardware reportedly has been dropping at a steady 25% annual rate. Memory and storage costs are said to be falling even faster, complemented by processing speeds that have increased fiftyfold.

But while computer technology has been improving dramatically, leased data communications lines have seen no meaningful improvement. Packet switching, statistical multiplexing and even IBM's Systems Network Architecture use phone lines that have changed little from the first days of telephones. These lines are optimized for voice but have recently been pressed into service to carry data, a task they perform ineffeciently.

Even the much-touted introduction of fiber optics does not solve the end-to-end problems of data communications because the local loop between the phone company office and a user's facility relies on antiquated copper wire technology and will for many years.

Given the strategic importance of teleprocessing — the fusion of computer processing with data communications networking — most organizations are rethinking their transaction networks, especially in light of newly emerging technologies.

Since the breakup of AT&T in 1984, many people have found that it has become difficult to obtain high-quality leased data lines where and when they are needed.

Even though there are more competitive options from which to choose, service levels have not actually improved. Being forced to deal with multiple telephone carriers has unfortunately added another level of confusion and frustration for users.

Because data communications personnel are often forced to deal with multiple carriers to obtain a single circuit, delays of several months for installation are common. Error rates and downtimes exceed what is allowable. Furthermore, attempts at problem resolution can easily degenerate into exercises in finger pointing.

There have been no substantial improvements in price for these lines either. As a result of divestiture, leased-line prices are now closely tied to costs. This action has eliminated the long-distance subsidy of local rates, where much of the cost originates.

Some classes of leased lines, namely, inter-Local Access and Transport Areas, have doubled and even tripled in cost since 1984. During the next several years, users can expect prices to rise further because private lines are more labor intensive and, hence, closely tied to increasing labor costs.

Moreover, many users are currently paying for data service capacity that they will not need until the future, overbuying and stockpiling to overcome the installation uncertainties that are typical of a newly competitive marketplace.

To solve the problems that divestiture has created and reap the maximum bottom-line benefit from teleprocessing, it makes sense in many cases to own a

VSAT UPDATE

transaction network rather than lease it — just as one owns on-line processors.

Greater uptime, productivity

Those organizations that take charge of their communications networks, capitalizing on teleprocessing opportunities, are the ones that will capture significant market share, expand their business bases and erect barriers to competition. Owning the communications network on an end-to-end basis translates directly into greater uptime and greater productivity.

Executed well, this strategy can help an organization do the following:

- Lower operating costs dramatically.
- Stabilize communications costs and insulate budgets from future increases.
- Improve the performance quality of transaction networks.
- Open up market opportunities by facilitating new applications and eliminating installation delays.
- Promote quick responses to changes in requirements and enable users to exert control over service priorities.
- Minimize coordination problems and finger pointing among vendors.
- Enhance network reliability by offering end-to-end network control.

VSATs can play a crucial part in a company's transaction networking strategy. Because VSATs are installed on users' premises, transactions go directly via satellite to a data processing center, bypassing troublesome telephone company lines and periodic tariff increases.

Major organizations such as J. C. Penney Co., Wal-Mart Stores, Inc., Ford Motor Co., Chrysler Corp., Merrill Lynch, Pierce, Fenner and Smith, Inc. and Citicorp are implementing VSAT networks for delivering data quickly, more reliably and at lower cost.

Fairfax, Va.-based Federal Engineering, Inc., an industry consulting firm, forecasts that the value of the market for micro earth stations — satellite dishes between two and 10 feet in diameter — could grow to $1 billion by 1990.

With so much business at stake, a host of companies have recently introduced VSAT products and services.

A partial list includes companies such as Avantek, Inc., California Microwave, Inc., Communications Satellite Corp., General Instrument Corp., Harris Corp., M/A-Com, Inc., Mitsubishi Corp., NEC Corp.,

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Teleprocessing-based systems can be found in virtually every industry segment.

■ On-line passenger reservation systems like American Airlines's Sabre and United Airline's Apollo have revolutionized the travel industry and have helped increase these carriers' market shares by as much as 20%. Nationwide car rental and hotel chains could not function effectively without their reservation systems.

■ Overnight delivery industry leader Federal Express Corp. touts its Cosmos parcel tracking system as unique. It enables on-line inquiry of parcel status from remote locations, locates delayed shipments and sends invoices to customers automatically. Even Federal Express's delivery vans carry on-board terminals.

■ American Hospital Supply Corp. was a networking pioneer when it installed the health care industry's first order-entry terminals on hospital premises in 1974. Today, the ASAP system's success is legendary, and competitors are still scrambling to catch up.

■ Organized in 1982, the Cirrus banking network has expanded rapidly and now covers 46 states. Its 1,425 member banks process some 200 million transactions annually, providing such services as cash withdrawals and balance inquiries from checking, savings and credit accounts.

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— Philip J. Freedenberg and Ronald F. Bosco

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VSAT UPDATE

VSATs No Longer A Pie-In-The-Sky Proposal

Very small aperture terminals (VSAT) are the latest generation in the evolution of digital satellite communications technology.

Ever since the first 30-meter International Telecommunications Satellite Organization's earth stations were built, technological improvements, both on the ground and in space, have been applied to consistently shrink the size of the earth station terminals. VSATs are much smaller than their predecessors, with antenna sizes ranging from 2 feet to 6 feet in diameter. Users can easily place them on their premises.

Because of their compact size and microprocessor intelligence, these stations are finding their way into applications in which users previously could not economically justify using a local earth station.

The typical VSAT network

A typical VSAT network consists of a multitude of small stations called remotes that transmit and receive information from a large central station, or hub. This architecture significantly reduces overall network costs because expensive components can be located at the hub and do not require duplication. Remotes that can both transmit and receive are priced at as little as $6,000 per station, while hubs can cost up to $2 million per copy.

The centralized VSAT approach fits well with the majority of the existing terrestrial transaction networks that are structured around geographically dispersed terminals homing on a central computer facility.

An added benefit of satellite technology is the ability to broadcast data from a central location to all remotes at no additional cost. Many VSATs also provide limited voice and video capability.

— Philip J. Freedenberg and Ronald F. Bosco

Scientific-Atlanta, Inc. and Vitalink Communications Corp. Many of these vendors have formed alliances with satellite carriers with the goal of providing full telecom service.

Some vendors now offer shared central hub facilities to bring the advantages of VSATs within reach of modest-size networks.

Choosing the VSAT product that is right for your firm can be a formidable task. To narrow the choices, ask the following questions:

- What current and future data rates does your company need to support to achieve desired response times?
- In which frequency band, should your VSAT network operate?
- What auxiliary services, such as facsimile, thin-route voice and video, does your network need to support?
- What topology is optimal for the network? How should you implement redundancy and alternate routing for maximum reliability?
- How should you integrate the VSAT network with existing data, voice and video networks?
- How will emerging standards such as the Integrated Services Digital Network affect the network?

The process of needs assessment begins with the development of a master communications plan that deals with short-term communications needs while it addresses long-term goals. The plan should address typical global objectives that include the following:

- Stabilizing and reducing current data communications costs while improving service quality and availability.
- Interacting with key user departments of an organization to assess their current and future transaction needs.
- Working with telecom personnel to determine the configuration of existing facilities and to gather data on costs and particularly sensitive problem areas.
- Reviewing the existing transaction network equipment, software and control structure in order to suggest immediate operational improvements.
- Defining both transmission and switching system requirements during the planning period of interest.
- Analyzing and providing for the security of transactions where required during transmission, switching and storage.
- Integrating applications subnetworks into a homogeneous structure in which feasible and defined standard methods of network access.

A typical master communications plan covers a period of five to 10 years. Such a plan should consider all predictable growth and the most economical method of providing the required services determined by cost/benefit studies. The plan should chart the growth and evolution of the overall system.

Once such a plan is in place, an organization can reap the maximum benefits of emerging technologies such as VSATs in the deregulated telecom industry.

Bosco is president and chief executive officer of Federal Engineering, Inc., an independent communications systems engineering and consulting firm located in Fairfax, Va.

Freedenberg is executive vice-president and chief operating officer of Federal Engineering. He is responsible for the technical and operational management of the company as well as for the development of new products and services.

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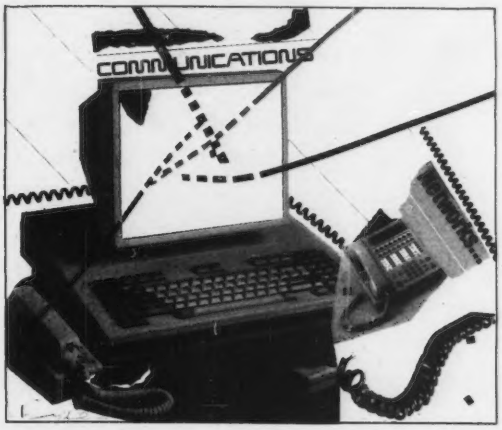
LAN TRENDS



No Easy Path To The Promised LAN

BY · MICHELLE · DOYLE

Despite technological innovations in local-area networks (LAN), connecting people, technology, places and equipment is not as easy as it sounds. The LAN, which many users once sought as the single solution to all communications requirements, has not proven to be the way to network nirvana — yet.

Fortunately for the industry, however, good LAN news is beginning to outweigh bad. Practical LAN strategies and products to fulfill the needs of small, medium and Fortune 500 companies are emerging.

Among the more interesting approaches surfacing from the confusion are LAN gateways, protocol converters and personal computer-based networks, all of which are becoming the basic building blocks of multitiered networks.

PC LANs are currently growing at a 50.8% growth rate with users installing an average of 7.5 PCs per network, according to International Data Corp. (IDC) senior LAN analyst Douglas Gold.

"By 1990, users will be connecting 9.5 PCs per network, and network shipments will reach approximately 133,000 per year," Gold says.

Multitiered LANs, which contain varying layers of LAN offerings, are now available or can be assembled to successfully and economically address user needs. These multitiered systems may just be the answer for MIS managers who want LANs that work now, will grow with the firm and still be functional parts of the expanded MIS systems for the near future.

Gabriel Dannunzio, vice-president of marketing programs for Boxboro, Mass.-based Micom Systems, Inc. agrees. "It's very difficult today to build a huge premisewide network from the beginning. It is a struggle to manage, network performance attributes probably will be disappointing, and effective centralized control is hard to achieve.

"Starting with a fairly segmented environment, a firm can integrate its facilities by installing multiple low-level LANs — then, as the need arises, link them. LANs should expand in sync with the extent of the applications," he says.

As users demand more autonomy over the flow of information, systems and technologies are bringing raw information closer to the hands of the end user. The trend toward distributed data processing seemed to make the search for a utopian LAN futile.

But this distributed DP direction has provided the impetus for some firms to become specialists and begin filling niche markets by providing products for gaps that until now have made LANs hard to use and costly to implement. Thus, more building blocks now are becoming available to firms that want to use a multitiered approach.

For the most part, the distributed DP push is based on a variety of factors. In many companies, MIS personnel are finding that not everyone has the same requirements in their need to connect to available computing resources.

While specific staff members do need to access sophisticated data bases residing on the firm's

DONNA LOEFFLER ILLUSTRATION

LAN TRENDS

minis and mainframes, users more often interact with each other on a departmental basis.

The proliferation of company PCs, from IBM Personal Computers to PC clones to Apple Computer, Inc. Macintoshes, is increasing pressure on MIS managers to install data communications links to tie these machines together. The price of the devices that connect computers and peripherals to the network cabling has dropped dramatically. The local network cost per connection has also decreased. More vendors have entered the competitive LAN arena, beginning to produce a much larger variety of network products.

LANs are increasingly able to link dissimilar computers as vendors offer diversified LAN packages and information transport products to fill as many different needs as there are types of businesses. Distributed-system LANs combine the capabilities of PC LANs and minicomputer-based terminal system LANs.

According to Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C., "The user has become an integrator. No single vendor supplies a pat solution. The theory of distributed resources is that you take information and bring it closer to the user environment."

Complexity leads to specialization

Increasing complexity generally leads to specialization. This tenet holds true in the LAN industry as well. As applications and technologies multiply, LAN makers are specializing. According to IDC's Gold, "There are 138 major manufacturers that will provide customers with hardware." Savvy MIS managers can find the LAN product with the right price/performance that makes sense for its particular organization.

The IBM Token-Ring, with its 4M bit/sec. speed and emphasis on mainframe and minicomputer connections, is a low- to high-end micro LAN. The price for IBM's Token-Ring currently runs approximately $1,150 per node.

In 1986, IBM introduced connections to the Token-Ring from its System/36, 3174 cluster controller, RT Personal Computer and 370 via the 3725 front-end processor. Big Blue's extensive backing and its ability to secure third-party support for its network are major forces behind IBM's push for the Token-Ring as an industry standard.

"The IBM Token-Ring is one of the most interesting recent developments," says Mark Stahlman, LAN research analyst for New York's Sanford C. Bernstein & Co. "In the second half of 1987, it will take off as soon as IBM develops more connections and so on to make it a total product," he adds.

AT&T's Starlan offers a maximum data rate of 1M bit/sec. but is considered a bit easier and less expensive to install and connect than the Token-Ring, making it more suitable for departmental work groups. According to industry research, about a quarter of all information transfers takes place between work groups within a single building.

Starlan uses six-wire, unshielded twisted-pair cabling as opposed to coaxial or more expensive shielded twisted-pair wiring, which is recommended for IBM's Token-Ring net. Starlan can be obtained for about $450 per node.

According to Harvey Freeman, vice-president of Minneapolis-based Architecture Technology Corp., "AT&T claims it is shipping Starlans at the rate of 700 per week. Many companies are pushing this product. Five semiconductor firms have come out with Starlan chips."

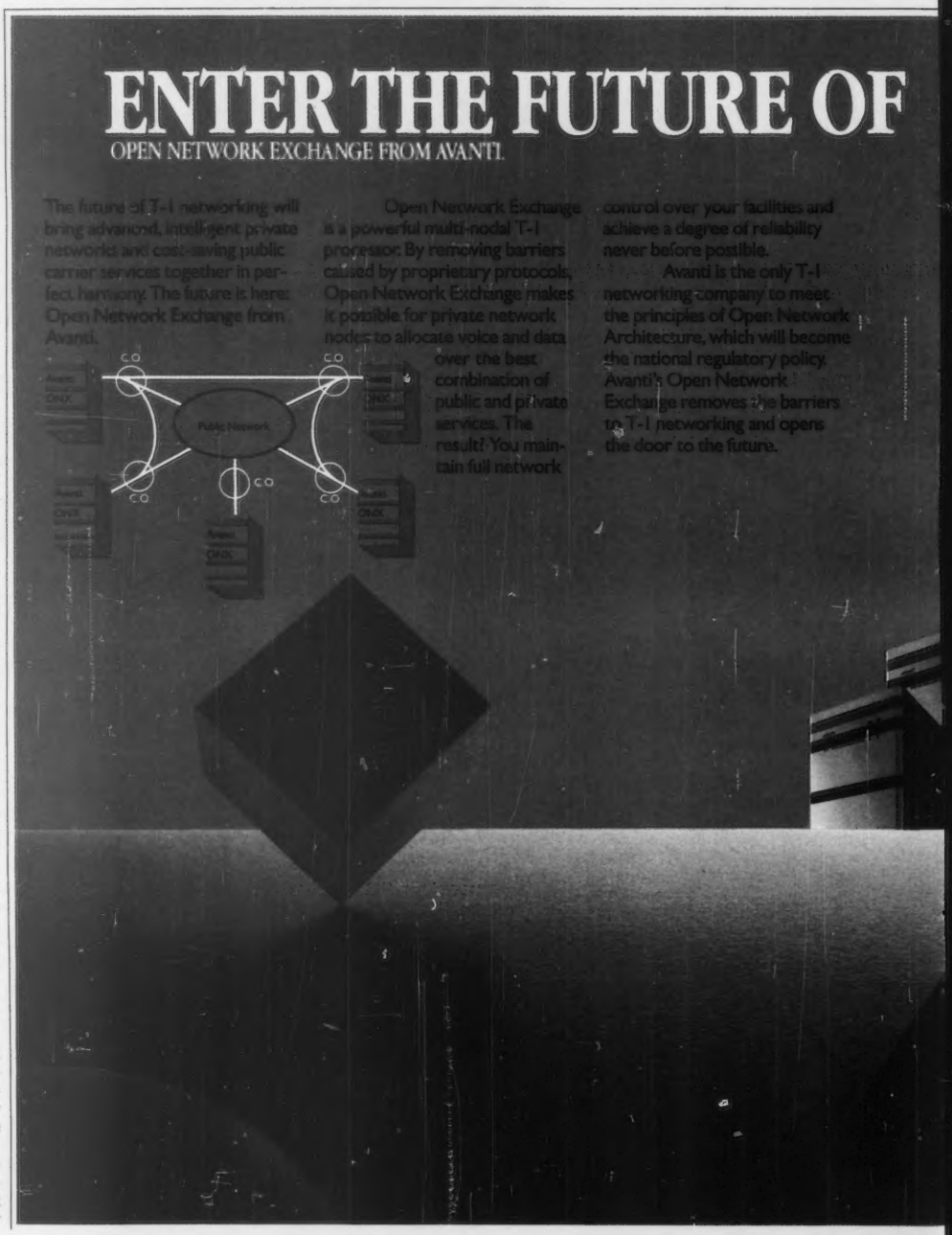
> *'MIS directors are fed up with technological obsolescence — buying LANs that a few years later are outdated. They are looking for products that have at least a five-year shelf life.'*
>
> **— Brad Baldwin Dataquest, Inc.**

Orem, Utah-based Novell, Inc. markets both a star-topology software network called Netware/S-Net and its own networking software. Up to 24 stations can be connected directly to Novell's 68B server. The cost of Novell's software, 68B server, hard-disk subsystem, four network interface cards and cables is approximately $12,000.

Novell says it provides software so customers can "now use a microcomputer network to do things that were traditionally done with minicomputers because there was no alternative." Essentially, Novell has become a specialist in the software networking environment.

According to IDC figures, at the end of 1985 Novell had an installed base of some 14,000 networks.

PCs offer users more capabilities than terminals, and once in place, they can be connected on a network for communications and peripheral sharing. There are many advantages to a PC network: The cost per node generally runs a fraction of the price of higher end products; installation and use is simpler; and there are



many application packages available. And, with the newer gateways, protocol converters and other connectivity links, PC networks are a natural.

Until this past year, most of the LANs in use throughout the business environment were those in the middle to high end. But because of the trend to distributed processing as well as the variety of industry standards becoming accepted and advances in LAN technology, there is a growing number of vendors that specialize in producing networks and peripherals geared specifically for the rapidly growing PC LAN market.

Brad Baldwin, LAN industry analyst for a San Jose, Calif.-based firm, Dataquest, Inc., says that standards can only help this growth. "There is definitely a trend toward standards in the low-end market — about 4M to 10M bit/sec. In the higher end, 24M bit/sec. and faster speeds, it is more acceptable to be proprietary. Often products have to be proprietary to be fast. Even in that area, however, there are beginning to be trends toward standards.

"MIS directors are fed up with technological obsolescence — buying LANs that a few years later are outdated. They are looking for products that have at least a five-year shelf life. Products supporting emerging standards will have such overwhelming support from vendors and the industry, and they will have long shelf lives," Baldwin says.

No single standard

Bernstein & Co.'s Stahlman predicts that "the standards we currently have will stay with us — neither widening nor consolidating. There never will be just one for hardware and one for software."

Businesses ranging from small offices to large Fortune 100 firms are seeking products that will be functional parts of their communications environments for several years. Research has shown that communications buyers are going back to basics and requiring that LAN purchases provide them with increased productivity across the corporation, the ability to use information as a strategic business tool and a price/performance ratio they can justify.

As a result, whatever the size of the firm, from the users point of view, there are dozens of critical issues to be addressed before the choice of a LAN is made. When planning a communications strategy, there are some essential criteria MIS and business managers will want to consider.

Users must weigh factors such as the ability to connect various communications devices internally and between buildings, the availability of vendors and interfaces, plus the prevailing standards surrounding the hardware and software they are evaluating. Users should also use the following guidelines in helping them choose the right LAN product:

- Ease of installation and use. How long does it take to completely install the network and get it up and running? Can inexpensive wiring be used? How will the network's cabling fit in with the existing building cabling? Does the vendor provide easy-to-understand documentation?
- The reliability of the vendor and product. Does the firm provide a toll-free number for support? What are the expected maintenance requirements and the firm's track record in furnishing service?
- Application capabilities. What built-in qualities does the product have to furnish the user with the applications it has now and will have in the future? Will the network grow with the customer's needs?
- Features. Does the product have the appropriate features necessary to handle the firm's needs such as economy, bandwidth, topology, speed, response times, error checking, resource sharing, troubleshooting, print spooling, file sharing and locking, password security and electronic mail and messaging?
- Extras needed. Will dedicated devices be needed strictly as servers for the network? Will adapter cards for the LAN be required that will take up one or more of those already filled expansion slots? What kinds of cabling and other peripherals are necessary to get the product up and running?
- Cost per node. What is the cost per node as calculated by the total package of goods necessary for a complete, up-and-running installation? Is the cost per node in proportion to the cost of the computer upon which it is being installed?

The distributed processing, multitiered LAN approach makes connectivity, standards, economy and ease of installation and use more important than ever before in the communications user's environment.

As IDC's Gold notes, "The local-area network [industry] is still a young industry. It has really only been around for four to five years. Within the next two to three years, it will shake out, shape up and begin to mature."

Thus, the state of the emerging LAN world today, while not perfectly attuned to every communications user's needs, is on its way to maturing into many specialty (and a few general-purpose) products, along with their related standards. The current situation is an enormous improvement over the past two to five years. LAN vendors can now provide a variety of solutions to maximize a company's efficiency and productivity.

According to Architecture Technology's Freeman, "Today, less than 5% of possible sites have any kind of LAN. This situation provides the opportunity for all levels of LANs to exist with connections between them as needed." F

Doyle is director of local-area network sales for Hopkinton, Mass.-based Avatar Technologies, Inc., which manufactures and sells connectivity products for micro-to-mainframe and micro-to-micro environments including IBM 3270 and PC LAN products.

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CONNECTIVITY PRODUCTS

DEC VAX Offerings Balance Connectivity, Closed Hardware

TECH TALK
Michael Tucker

With this issue, *Computerworld Focus* features a new column that deals with recent product introductions — but not in the way you think. The idea is not to give you a simple listing of what's out there and where you can buy it. Rather, it will give you information you need as a manager. It will explore what new products mean in the context of the industry as a whole.

And, of course, this task may not be particularly easy.

This month, however, *Computerworld Focus* got lucky.

On Feb. 10, Digital Equipment Corp. of Maynard, Mass., introduced two computers — the Microvax 2000, a $10,000 desktop VAX, and the Vaxstation 2000, a 32-bit workstation priced at $10,500. DEC introduced machines that were simultaneously as open *and* as closed as computers can be.

This column will deal mostly with the Microvax, but that's not meant to slight the Vaxstation. Indeed, the Vaxstation is a good-looking box with superb connectivity to other VAX products. The fact that it costs less than the Microvax 2000 is interesting because it means a DEC-oriented MIS shop could actually end up spending more on its workstations than on its multiuser systems.

Microvax 2000 reportedly is DEC's lowest-cost mulituser VAX.

The Vaxstation 2000 may be just one more forerunner of the personal workstations of the future, machines loaded to the gills with artificially intelligent interfaces, three-dimensional graphics, synthetic voice and whatever else is required to link human beings with increasingly inexpensive computer servers.

But the focus of this column remains the Microvax 2000 because it is the very first (but probably not the last) desktop VAX.

It's important to understand the significance of a desktop VAX. Envision the vast library of VAX applications that has been built up for years and years, running on a desktop machine that is actually smaller than an old-fashioned DEC terminal and that costs less than some fully expanded PCs.

Then imagine all of those applications communicating with every other VAX in the universe. Communicating easily because the VAX on the desktop is exactly the same as all those other VAXs — right down to the very last line of operating system source code.

The Microvax 2000 chassis contains a single-board computer consisting of a VAX-on-a-chip very large-scale integration (VLSI) CPU plus most (but not all) of the other components of a standard Microvax II. The machine will support four users in a shared-logic situation or up to 16 users on Decnet. In standard configuration, the 2000 comes with 4M bytes of memory, 42M bytes of disk storage and a license for either the VMS or Ultrix (DEC's Unix version) operating systems.

Room for more DEC products

An expansion chassis for additional storage and memory is available. However, don't expect that chassis to hold anything but DEC products. When DEC scaled down the Microvax II, it left out a few things, including the bus. Data communications inside the 2000 happens on th board itself or it doesn't happen at all.

The official explanation for this design was that it saves space. But cynics are quick to suggest that it also makes the 2000 a closed box. There simply isn't going to be a third-party aftermarket for DEC desktop machines unless some brave soul figures out a way to solder connections onto the 2000's board. Given DEC's current legal battles with third-party suppliers, that move might be very dangerous indeed.

Actually, there is one other way that developers might build add-ons for the 2000. Under questioning at the introduction, DEC officials noted that in order to accommodate industry-standard disk drives, the 2000's

See **DEC** page 80

Avanti T1 Net Processor Bows

NEW YORK — Avanti Communications Corp. has introduced Open Network Exchange (ONX), an intelligent T1 network processor that reportedly facilitates access to value-added network services such as AT&T's Megacom and Software Defined Network.

The company said ONX can create networks of more than 100 nodes with more than 7,400 active channels per node. It can simultaneously support up to 16 aggregates at 1.5M or 2M bit/sec. data transmission rates. Avanti added that it designed ONX on the principle of an open network environment like the Federal Communications Commission's Open Network Architecture.

ONX's distributed adaptive routing enables automated least-cost circuit routing and incorporates distributed and parallel network processing. The system uses a multiple and redundant reduced logic bus structure to increase fault tolerance. To achieve unrestricted netwide channel routing within the Subrate Data Multiplexing standard, ONX uses a three-dimensional switching array.

Unobtrusive diagnostics

Avanti added that ONX performs diagnostics without interfering with the operation of ONX nodes or the network.

Finally, network management is also possible through the Open Network Management System/PC software, which runs on an IBM Personal Computer with a color graphics display. It features event and alarm logging, network inventory control and also generates color topographical and circuit-tracing information.

Prices for ONX range from $35,000 to $100,000, depending on the size of the network.

For further information, contact Avanti Communications Corp., Aquidneck Industrial Park, Newport, R.I. 02840.

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ONX can create networks of more than 100 nodes.

Success Of IBM Sales Revamp Lies With MIS

BLUE BEAT
Deidre Depke

Last fall, when IBM announced it would increase its direct sales force in 1987 from 2,300 representatives to 2,800, most IBM watchers assumed the company was simply trying to boost sales.

But IBM's intention was far more serious: The firm clearly launched yet another reorganization of its marketing force.

This time around, though, it's back to the future for IBM. The company is returning to the sales strategy that carried it through the 1960s and '70s, a sales strategy that organized the sales force along vertical market lines. IBM executives told their largest corporate customers in an Orlando, Fla., meeting early in February that the company would target its sales force along such industry lines as banking, insurance and finance.

That's a departure from the philosophy behind its September 1985 move to split its corporate sales force into regional groups.

The Florida announcement is probably the only one IBM will make on the subject. The company's reserve can be attributed to embarrassment: Its quiet move to reorganize its marketing just 18 months after the 1985 sales revamp indicates the extent to which the regional sales force concept has failed.

Under the 1985 plan, sales representatives were responsible for selling the entire product line — from micros to minis to mainframes. They were divided only by the geographic areas in which they sold.

The result was a sales force unwilling to market low-end products such as the company's Personal Computer line because the lure of high margins on high-end products proved too seductive.

Customers were confused and irritated by the change — sales reps they had worked with for years were suddenly replaced. And, more often than not, the replacements had little in-depth knowledge of user applications — they simply had too many products to sell. IBM was left with disastrous sales for 1986, with earnings plunging nearly 50% from the year before.

So IBM decided to return to what had once worked — assigning salesmen to specific industries, allowing them to specialize and sell vertical technology to vertical markets.

This strategy carried IBM through its severe slump in the '70s and established Big Blue as the world's premier mainframe seller.

Industry-specific thrust

IBM's next micro product introduction, which is expected in April and should wield about 150 products, will reflect the change to a vertical selling force. Many microcomputer products introduced then will likely be targeted to specific industries.

Sources say that IBM initially intends to reposition sales reps to target three vertical areas: education, telecommunications and desktop publishing. These sales specialists will be assigned to branch offices in regional areas and will concentrate on selling in those industries or to users in other industries with those vertical needs. Although these salesmen will continue to sell much of the company's product line, they will specialize only in specific hardware and software and will sell only to customers that have a need for such products.

This news is not good for IBM's value-added reseller (VAR) force, which has specialized in vertical market selling.

Recent IBM enhancements to its reseller program, which include distribution of sales leads to resellers, IBM participation in industry seminars and IBM support for remarketers' customers, are intended to take the sting out of its upcoming push into VAR territory.

But as the VARs point out, they may not be out of the picture yet. IBM's success with its revamped marketing force ultimately lies with the MIS user community. Fed up with IBM's bureaucracy and connectivity problems, buyers have increasingly been turning to other vendors for products and services.

IBM must move quickly with its marketing reorganization and product introductions. And that could be a problem — fast moves have never been in IBM's repertoire.

Depke is editor of "IBM Watch," a biweekly newsletter to be published by CW Communications, Inc. "IBM Watch" will be dedicated to reporting and analyzing IBM news and trends worldwide.

DEC from page 79

expansion chassis contains a connector that conforms to the industry-standard small computer systems interface (SCSI). And, they noted, some clever people would probably figure out a way of building attachments to the connector.

If so, then the 2000 could be a test of whether it is possible to have a closed architecture in an age of standards. The handwriting will be on the wall the minute someone manages to successfully and legally link that SCSI to a third-party expansion chassis containing DEC-compatible boards.

But, if the 2000 is closed to hardware, it is open in terms of connectivity. It can talk to IBM machines thanks to an IBM Systems Network Architecture (SNA) implementation that DEC officials point out is actually superior to SNA on Big Blue's own departmental machine, the 9370. But, of course, the Microvax 2000's real claim to fame is that it can talk to other VAXs — a class of machines that now stretches from the desktop to the mainframe.

Micro fabrication technology

In a sense, this VAX-to-VAX connectivity is nothing revolutionary. It doesn't take much in the way of new technology to make two identical machines communicate. The real innovation here is in the 2000's micro fabrication technology through which, the lack of a DEC Q-bus notwithstanding, the 2000 is a complete VAX capable of running the same software as all those other VAXs that have been around for ages.

It is instructive to look at the software vendors that announced support for the 2000 at its introduction. The press conference included developers such as Tektronix, Inc. in Santa Clara, Calif., McDonnell Douglas Corp. in St. Louis, BBN Software Products Corp. in Cambridge, Mass., Access Technology, Inc., in South Natick, Mass., and Cadre Technologies, Inc. in Providence, R.I. The applications range from VLSI chip design to office automation, but they all require extensive communications.

Cadre, for instance, makes a computer-aided software engineering (CASE) product known as Teamwork. CASE applications frequently require that large numbers of systems analysts, programmers and managers share the same information. Until now, Cadre has stubbornly kept Teamwork on a limited number of technical and engineering workstations with powerful connectivity features, such as offerings from Apollo Computer, Inc. and Sun Microsystem, Inc.

Now, for the first time, Cadre is going with a general-purpose system, the desktop VAX. And, because "a VAX is a VAX is a VAX" (as DEC officials were happy to relate at the introduction), Cadre's technology is now accessible to the entire VAX line.

Meanwhile, the only IBM machine Cadre supports is the RT Personal Computer. It is that sort of fact that makes the Microvax 2000 so disturbing to DEC's rivals, specifically IBM.

Facing a dilemma

In some ways, the Microvax 2000 personifies the dilemma facing computer vendors today. On the one hand, buyers and software developers want connectivity and are more than willing to drop one supplier for another in order to get it.

On the other hand, too much openness can be deadly. This, of course, was the lesson that IBM learned the hard way with the PC. In opening the PC to just about everything, IBM came to dominate the personal computer market, but, just as IBM executives could not keep a trademark on the acronym PC, so, too, did they lose control of the PC market.

IBM might have avoided the trap if it had been watching Atari, Inc., which very nearly perished when it released the specifications for its video game cartridges, hoping to increase the sales of its video game installations by increasing the amount of software available for them. Only too late did the company discover that what profit remained in the dying video game industry was in the games rather than the installations.

Ironically, it was Apple Computer, Inc. that had been watching Atari and that first demonstrated a closed/open marketing strategy.

When Apple introduced its next-generation PC, the Macintosh, it displayed a

See **DEC** page 82

VAX Facts

■ **The Microvax 2000.**

Standard configuration: 4M bytes of memory, expandable to 6M bytes; 42M bytes of disk storage; software license for either IBM's VMS or DEC's Ultrix. Supports up to four users directly, up to 16 users via a local-area network.

Storage options: Full- and half-height 5¼-in. storage disks. With two hard disks, total storage would be 142M bytes. A 95M-byte cartridge tape for software input, load and backup is available as well as expansion chassis for additional upgrades.

Software supported: Most software written for VAXs, including Vaxcluster and All-In-1.

Base price: $10,000.

■ **The Vaxstation 2000.**

Standard configuration: 4M bytes of memory; a 42M-byte disk drive; a 1.2M-byte floppy drive; an Ethernet adapter, a 19-in. monochrome monitor (color available) and a software license for either VMS or Ultrix. Diskless configurations are also available.

Software supported: Most software written for VAXs, including Vaxcluster.

Base price: Disk-based — $13,150; diskless — $10,500.

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IBM Unveils High-End 3090

RYE BROOK, N.Y. — IBM has announced the 3090 Model 600E processor, the company's most powerful computer to date.

The Model 600E contains six CPUs and, according to IBM, offers up to 60% more computing power than its previous largest model.

Maximum storage on the Model 600E is more than 1.2G bytes, double the storage that was previously available on IBM's largest machine.

IBM vector facilities can be attached to the 600E, which results in 60% more computing power, according to company spokesmen.

To exploit fully the Model 600E's hardware capabilities, IBM has also announced additions and enhancements to its VM software, increased vector support for VS Fortran and APL2 and improved data management in DB2 and MVS/XA data facility products.

IBM credits the 3090 Model 600E's performance to faster instruction execution time, the use of IBM-developed and manufactured 1M-bit memory chip technology and a 32% denser version of IBM's Thermal Conduction Module technology.

The 3090 Model 600E is priced at $11.5 million.

For further information, contact IBM, Information Systems Group, 900 King St., Rye Brook, New York 10573.

Circle Reader Service Number 336

NRC Option Ties LANs To Wide-Area Nets

OXNARD, Calif. — Network Research Corp. (NRC) has announced an add-on option to its Fusion Network Software to support Digital Equipment Corp.'s DMR-11 and DMV-11 high-speed controllers.

The option enables users to attach their local-area networks (LAN) to wide-area networks via modems.

Teamed with this option, Fusion Network Software interconnects LANs at several locations and transparently shares resources, according to the vendor.

The option uses Transmission Control Protocol/Internet Protocol file transfer protocols between geographically separated LANs to provide users with interconnectivity.

NRC said the fusion implementation of the Telnet virtual terminal session or File Transfer Protocol session is transparent to the user even when LANs are separated by thousands of miles.

Data transfer rates

The NRC add-on option supports high-speed data transfer rates of up to 56K bit/sec. for DMV-11 controllers and up to 1M bit/sec. for DMR-11 controllers.

Both data transfer rates are for point-to-point communications between DEC VAX machines.

Pricing for the option is $720 for the DEC VAX and $1,200 for the DEC VAX-11/700 series.

The product is priced at $1,800 for the DEC VAX 8000 series.

For further information, contact Network Research Corp., 2380 N. Rose Ave., Oxnard, Calif. 93030.

Circle Reader Service Number 337

Du Pont LAN Extends Appletalk

WILMINGTON, Del. — The Du Pont Co. has designed a fiber-optic local-area network (LAN) that can replace or extend the twisted-pair copper wire of Apple Computer, Inc.'s Appletalk personal network cabling system. Depending on system traffic, the fiber-optic LAN can connect more than 100 computers, each up to 4,900 feet apart.

The fiber-optic LAN is modular and consists of a shielded cable assembly linking each computer or peripheral with an electrical/optical signal converter into which the cable is terminated.

The Du Pont system converts normal electrical signals used by Apple Macintosh computers and other Appletalk devices to an optical signal. It then transmits this signal along the optical cable and returns it to its electrical form at its destination. The technology is reportedly transparent to Appletalk.

Two configurations

The Du Pont network can be set up in two configurations: a point-to-point daisy chain or a star configuration using a Du Pont network concentrator.

In a star configuration, the cable is routed from a wall outlet to one of eight fiber-optic or two electronic ports on the concentrator. The network concentrator was designed to be rack-mounted in a central wiring closet.

Available immediately, pricing for a simple point-to-point LAN ranges from $250 to $400 per node. Costs for a star configuration LAN range from $500 to $700 per node.

For further information, contact Du Pont Connector Systems, 515 Fishing Creek Road, New Cumberland, Pa. 17070.

Circle Reader Service Number 338

Fibronics Network Conforms To OSI, ANSI Standards

HYANNIS, Mass. — Fibronics International, Inc. has introduced System Finex, a fiber-optic local-area network, which, according to the vendor, is one of the earliest networks to conform to the American National Standards Institute's Fiber Distributed Data Interface (FDDI).

The System Finex is a dual-fiber, high-bandwidth, counter-rotating token-ring network. The company said the network will connect heterogeneous mainframe computers, link engineering workstations together or link these engineering workstations to mainframe computers. Through bridges and gateways the system can also interconnect existing Ethernet networks.

System Finex is a hardware and software product that reportedly addresses all seven layers of the International Standards Organization Open Systems Interconnect networking model. With the high backbone speed of an FDDI network, Fibronics said, data transfer rates of 100M bit/sec. are possible.

System Finex is priced at $40,000 per node or station.

For further information, contact Fibronics International, Inc., Communications Way, Independence Park, Hyannis, Mass. 02601.

Circle Reader Service Number 339

PCs, Unix, VAXs Share Applications

SANTA BARBARA, Calif. — Communication Machinery Corp. announced Microsoft Corp. MS-DOS-compatible Transmission Control Protocol/Internet Protocol (TCP/IP) software that allows personal computer users to communicate and share applications with Unix-based workstations and Digital Equipment Corp. VAX systems.

The TCP/IP protocol software features an industry-standard IBM Netbios interface that reportedly allows MS-DOS packages to operate on Ethernet networks without alteration.

In addition, application software for TCP/IP under MS-DOS includes Telnet virtual terminal session and File Transfer Protocol. These may communicate with TCP/IP host servers such as the vendor's TCP/IP for Microsoft Xenix, Unix or DEC VMS environments.

Executes transport, network layers

The TCP/IP protocol software reportedly executes the transport and network layers of the International Standards Organization's Open Systems Interconnect model.

With Netbios, Communication Machinery's TCP/IP product costs $250.

For further information, contact Communication Machinery Corp., 1421 State St., Santa Barbara, Calif. 93101.

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Put A Vendor In The Hot Seat

To enhance product coverage for our readers, *Computerworld Focus* is instituting a new column in its product section. The column will consist of product- and service-related questions that you, our readers, would like us to ask a particular vendor.

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Circle Reader Service Number 4

CONNECTIVITY PRODUCTS

Cabletron Introduces Diagnostic Ethernet Transceiver, Repeaters

EAST ROCHESTER, N.H. — Cabletron Systems, Inc. introduced three Ethernet hardware products that feature the firm's Lanview, a built-in diagnostic system. Lanview uses LED displays to indicate transmission, external transceiver power, internal power and collisions to help determine network and node problems.

The MT-800 Ethernet Multiport Transceiver provides eight ports to connect Ethernet or IEEE 802.3 standard hosts. Each port provides the full data rates as an individual transceiver, eliminating the need for eight discrete transceivers. Because each port can support another MT-800, the multiport transceiver can support up to 64 connections.

Repeaters debut

Cabletron's two new repeaters can connect full-length thin or thick Ethernet coaxial cable to transmit retimed data packets, regenerate the preamble, extend collision fragments, automatically partition problem segments of cable and reconnect unaffected segments. The LR-2000 Local Repeater links two cable segments via two 15-pin ports. The MR-9000C Multiport Repeater connects up to eight segments of Ethernet cable.

Single-unit pricing is $975 for the MT-800, $1,365 for the LR-2000 and $2,795 for the MR-9000C. All three products are immediately available.

For further information, contact Cabletron Systems, Inc., Box 6257, Cabletron Industrial Park, 10 Main St., East Rochester, N.H. 03867.

Circle Reader Service Number 341

DEC from page 80

machine with high connectivity via Appletalk and no expansion slots. At the time, Apple was denounced for the approach, and the Mac was overshadowed by Microsoft Corp. MS-DOS/Intel Corp.-based machines.

Now, if rumors prevail, IBM is looking to build its own unclonable Mac-like machine. Big Blue is expected to introduce a closed 32-bit PC — an executive workstation capable of connecting to IBM mainframes but tightly sealed from the hardware aftermarketers and clone makers that burned Big Blue so badly in the past.

At press time, IBM had not introduced any such closed PC. But, in a sense, it does not matter. DEC has already done it for them. In many ways, the Microvax 2000 is everything the 32-bit PC is feared to be — multiuser, multitasking, able to tie to mainframes and, ultimately, sealed.

Strategy for the future

The significance of the Microvax 2000 is that it may define the sort of strategy that computer companies will have to use in the future.

It may be that the only way for a computer maker to prevent its single-user or multiuser desktop systems from turning into a commodity is to make them as connectible as possible to software and as closed as possible to third-party hardware and cloning. If the next IBM PC is as closed as the Microvax 2000, it will be hard to believe an open architecture is a viable business plan.

Fortunately, we will soon have additional evidence one way or the other. PC-compatible makers continue to support an Intel/Microsoft standard machine. And, Apple also introduced a new product — the Macintosh II (see analysis page 15). In an abrupt turnabout, Apple is embracing an open architecture. Already, some PC board makers are gearing up to produce add-in products for the new Mac.

Of course, while many of these are single-user machines unrelated to the corporate accounts that DEC and IBM hope to control, their success or failure will say much about which approach — connectivity open or connectivity closed — can justify the existence of a vendor.

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CONNECTIVITY PRODUCTS

Dot Matrix Printer Features Built-In Networking Capabilities

SPOKANE, Wash. — Output Technology Corp. introduced Trimatrix 850 Printnet, a dot matrix printer with built-in networking capabilities that supports up to five users connected directly to the 850's resident serial ports.

The printer is patterned after Output Technology's 850XL dot matrix printer and has a throughput of 240 line/min. An internal memory of 256K bytes allows users to store large jobs, and a 1.5M-byte option will also be available.

For multiple users, the speed and networking capabilities make 850 Printnet a simple alternative to traditional networks requiring external controller boxes and custom software design, according to the vendor.

In addition to serving as a printing station for multiple users, 850 Printnet can also be used as a network communications controller and memory storage unit.

The 850 Printnet will be available in mid-April for a suggested retail price of $2,995. The unit is said to have a six-month warranty and will be serviced nationwide by NCR Corp.

For further information, contact Output Technology Corp., Suite 6, East 9922 Montgomery, Spokane, Wash. 99206.

Circle Reader Service Number 342

Able Releases Net Exchange

COSTA MESA, Calif. — Able Computer has introduced Micro Integrated Network Exchange (Minx), an asynchronous network exchange with resource management capabilities.

The desktop-size Minx system supports up to 480 ports in both distributed and concentrated applications.

Able Computer said that Minx customers can begin switching for as low as $10 per port.

Complements existing nets

Minx complements existing file transfer networks enabling companies to off-load terminal and personal computer traffic to the Minx network.

The system uses a combination of terminal, printer and host servers to connect users and computers in a distributed environment similar to a local-area network. Terminal and printer servers are connected to Minx by twisted-pair wiring, up to 2,000 feet away.

Minx is priced at $5,000.

For further information, contact Able Computer, 3080 Airway Ave., Costa Mesa, Calif. 92626.

Circle Reader Service Number 343

Telcor Offers Modem Tools

NATICK, Mass. — Telcor Systems Corp. has announced two data compression products. The Accelerator 3124 is a modem attachment that Telcor said can quadruple the full-duplex, asynchronous data transfer rates of any 1,200, 2,400, 4.8K or 9.6K bit./sec. modem up to 38.4K bit./sec. over dial-up telephone lines.

As an attachment that reportedly can interface with any modem, the Accelerator 3124 is available with Data Encryption Standard security, call-back and password security, a 17-digit master key and centralized net management. The Accelerator 3124 is base priced at $695 as a modem attachment and $895 with options.

The Accelerator 2496 modem is a 2,400 bit/sec. V.22 modem with built-in data compression that can quadruple data transfer rates up to 9.6K bit/sec. on a dial-up telephone line, according to the vendor. The Accelerator 2496 is priced at $995 or $1,195 when including the same options listed for the 3124.

For further information, contact Telcor Systems Corp., 12 Michigan Drive, Natick, Mass. 01760.

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April 8-9, San Francisco — **Metropolitan-Area Networks.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

April 8-10, Seattle — **Implementing Local-Area Networks.** Also being held April 29-May 1, Anaheim, Calif.; May 6-8, Uniondale, N.Y.; May 13-15, Raleigh, N.C. Contact: Center For Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

April 9-10, Dallas — **T1 Networking.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

April 21-23, Chicago — **Optimizing Software Productivity and Quality.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

April 22-23, New York — **Standards: The Ties That Bind?** Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

April 22-24, Long Beach, Calif. — **The Artificial Intelligence and Advanced Computer Technology Conference & Exhibition.** Contact: Tower Conference Management Co., 331 W. Wesley St., Wheaton, Ill. 60187.

April 22-24, Washington, D.C. — **Changes in the Information Center: Traditional Roles Expand to Support OA and PCs.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

April 23-24, Chicago — **ISDN: Concepts And Applications.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

April 27-30, New York — **The 1987 Association for Information and Image Management Show.** Contact: Association for Information and Image Management, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

April 27-May 1, Dallas — **The Revolution in Information Systems Tools & Techniques.** Also being held May 4-8, Boston; May 18-22, Washington, D.C. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

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April 29-May 1, San Francisco — **Network Management, Control and Problem Determination.** Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

April 30-May 1, Bethesda, Md. — **Fifth Annual Telecommunications Industry Conference.** Contact: Gartner Group, Inc., P.O. Box 10212, Stamford, Conn. 06904.

May 10-14, Dallas — **APL87.** Contact: APL87 Registrar, Suite 210, 440 Northlake Shopping Center, Dallas, Texas 75238.

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